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PRIMER

OF

PSYCHOLOGY

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BY

GEORGE TRUMBULL LADD

PROFESSOR OF PHILOSOPHY IN YALE UNIVERSITY

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THIS

BOOK

IS DEDICATED

TO THE YOUNG DAUGHTER

OF MY FRIEND AND COLLEAGUE

WHO HAS BEEN KIND ENOUGH TO READ

IT AND TO SAY THAT SHE HAS

UNDERSTOOD AND

ENJOYED

IT

PREFACE

THE writing of this little book was undertaken in part as a recreation between two much more bulky and serious pieces of work. From the personal point of view it may be regarded as the result of a feeling of curiosity—of the author's desire to make the experiment of telling, in a manner to correspond fairly well with its chosen title, the story of the mental life. As the dedication shows, a young friend was kind enough to offer herself as both subject for the experiment and judge of its result. I have tried to make my confidence in the intelligence of my youthful critic the measure of my success.

But besides the more personal interest in such an endeavor, I have hoped in some degree to supply what I believe to be a real need. For it cannot be doubted that there are many adults, as well as youths, who would find some pleasure and perhaps more profit in reading a very brief and simple treatise on psychology.

While adopting the title of "Primer," it has been my aim to avoid both of two extremes. One of these is the extreme of "talking down" to the reader in such manner as to keep unpleasantly before him his own lack of familiarity with the subject

—not to say lack of intelligence and of willingness to think for himself while acquiring the information and thoughts furnished by others. It is my experience that intelligent and self-respecting youth resent this; and, certainly, it is offensive to almost all of that maturer audience which any genuine scholar would care to reach. The other extreme is that of dryness and of difficulty due to excessive condensation without dropping the use of technical language and of strictly scientific modes in presenting the results of previous researches.

In a word, this book simply aims to narrate some of the more obvious facts and principles known to modern scientific psychology in plain and familiar English, and in an orderly but wholly untechnical way. Anything like completeness, whether as respects the topics touched upon or the treatment given to any one of these topics, must not be expected.

I hope and expect that this book will be useful for the instruction of the young in the important subject with which it deals. It would seem not unreasonable also to think that it will be welcome to many adults who are willing to spend a few (but only a *few*) hours on easy lessons in psychology. It is likely, too, that it may prepare the way, with both classes of readers, for the study of larger and more serious works on the same subject.

It is worth while only to add that the considerable number of experiments constantly used to illustrate each topic can, with few exceptions, be performed

by any reader. Most of them require little or no apparatus; and, of course, by following them out for one's self the interest and value of so elementary a study will be greatly increased. Finally: this book is not to be regarded as an abridgment of any other existing work, whether by its author or by other writers on psychology. It is what its name best indicates—a "Primer."

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PRIMER OF PSYCHOLOGY

CHAPTER I

THE MIND AND ITS ACTIVITIES

No one can *fully* understand what Psychology is, or how to study it, who has not already given much attention to this subject. And if we consult those whose business it is to inform us, we shall doubtless find some difference of views in their answers to both these questions. But the same thing is true, to a large extent, of every subject of study; for often the definitions which teachers give earliest to their pupils, or which the writers of books place upon their first pages, are among the last things to receive general agreement from scientific investigators. This is, to some extent, true of all the sciences; and there are certain reasons why it is especially true of the science we are about to study.

What is Psychology?—In spite of all difficulties, however, it is possible to answer this question in a manner that will enable one to begin study with a fairly clear notion of both subject and method. Only it will be necessary to use some words in the definition, the meaning of which must be left to be made clearer as the study of the subject advances. In considering What is Psychology? we may take

our start from any of the experiences of the daily life. For it is one advantage, at least, which this study has over all others, that its facts and specimens do not have to be sought at a distance or bought with money from those who have collected them—as is the case with botany, geology, physiology, etc. We all always carry the facts about with us; we are ourselves the specimens to be studied.

Let, then, any of the most familiar of one's experiences be taken as examples. Suppose, for instance, that while walking on the street the attention is attracted to some person approaching from a distance. At first we cannot see this person clearly; and so we ask ourselves the question: Who can that be who is coming this way in the distance? It is likely that interest is now awakened to answer the problem we have thus set ourselves. We look more intently, and in the meantime think diligently whom this is like; or who it is probable would be coming this way at this particular time. Soon the features and the dress are discerned more perfectly; but as yet we cannot recognize the person or give to him his name. As might popularly be said: we cannot "imagine" who this can possibly be. All at once, however, recognition takes place; it comes into our minds that this is Mr. X., whom we met at the sea-side last summer, and with whom we remember to have spent some hours in rowing or lawn tennis. Thereupon a feeling of pleased gratification takes the place of the previous feeling, which was that of being interested and yet puzzled and thoughtful in

the effort to remember. We immediately make plans to invite him to dinner and to show him about the town; but remembering now that we have an engagement already made which we ought to keep, a change of feeling again occurs. And finally we choose between two possible courses, after a quick process of reasoning, in which we picture to ourselves the probable advantages or disadvantages of either course.

The Point of View.—Experiences like those just described happen often enough in the life of every one. But they are not ordinarily regarded from the point of view which psychology takes. Should this particular experience occur with any one of us precisely as it has been narrated, it would not be our own activities, as such, in which we should probably be interested. It would rather be the solution of the questions: Who is the person approaching? What shall I call him? How shall I greet him? and, What shall I do with him after we have met? which would interest us. That is, our problems would be "practical." They would have little or nothing to do with our own thoughts, feelings, and plans, *as such;* but everything to do with the objects about which we were thinking, toward which our feelings were excited, or with reference to which we were planning. This ordinary practical point of view is sometimes called *objective.*

Psychology, however, completely changes the point of view from which to regard all events like the foregoing. From its changed point of view

then let us briefly consider anew the same narrative. And, first of all, we notice that the narrative speaks of "attention" as being attracted and then willingly fixed upon an object; of "perception," or the "knowledge" of what the object is, as being gained by use of the "senses" (in this case, the eyes), and by "thinking" and "remembering" until clear "recognition" takes place; of "feelings" that change their character and tone of "pleasure" or "pain;" and, finally, of "plans" and "choices," and of the carrying of them out in courses of conduct. Now, *attention, perception, thinking, remembering, feeling, whether painful or pleasurable, and planning and choosing—all of them, as such, and for their own sake —are the facts which psychology studies.*

A Study of Relations.—But let us return again to the narrative, and warm and enliven it by recalling something similar in our own experience. This narrative plainly implies what the examination of all experience proves—namely, that the different forms of experience (such as attention, perceiving, remembering, etc.) depend upon each other. The story, as it was just told, showed how the feeling of interest awakened and fixed the attention; and how attention influenced the growth of perception. For if we had not been interested and attentive, we should probably have passed the person by without recognizing him. The story also showed how to notice likenesses and unlikenesses, and to imagine, to remember, and to think, are necessary in order to perceive things with a full recognition. It also

showed how feelings of interest and of expectation, and the like, influence perceptions and thoughts; and how, in turn, perceptions, memories, and thoughts influence the feelings. And, finally, feelings were seen to lead to plans and choices. Although, if we think of it in the right way, there was a sort of plan, or choice, implied in the very determination to solve for ourselves the question, Who is that person in the distance? as well as in all the effort of attention and memory which finally led to the solution of this question.

A Study of the Self.—Only a little more thought upon the meaning of our narrative is necessary to discover another fact which is very important to a correct understanding of the whole matter. If we ask ourselves, Whose was the perception, the thinking, the feeling, the planning, etc.? we at once answer: "They were all *mine*, of course." *I* looked; *I* perceived; *I* remembered; *I* felt pleased or puzzled; *I* formed the plans and made the choices. But now if the question be raised, How do you know this; how do you know that the facts of perceiving, thinking, feeling, and planning, all belonged to your self? the ordinary person would, probably, only stare in reply. But the stare would amount to saying, "It is quite beyond my power to conceive of such facts as these as belonging to any other being than a Self." Indeed, when I know that they are occurring, or remember that they have occurred, I know them and remember them only as "self-belonging." I am the subject of all the facts thus known or remembered by

me. This, then, is the point of view taken by psychology. It is called the *subjective* point of view. For psychology is a study of the experiences and doings of a "subject," or "self."

We see, then, that *psychology regards all the facts which it studies as connected together, and as belonging to some so-called "subject," or person, which each one of us ordinarily calls "I," or "myself."* Only by studying its facts in this subjective connection can it make any progress as a science. For the facts which it studies are these very thoughts, feelings, and plans, regarded by each subject of them, whenever he regards them at all, as peculiarly his own.

Consciousness and Mind.—Thus far we have spoken of several classes of those facts which psychology studies, such as facts of attention, of perception by the senses, of remembering, thinking, feeling, planning, and the like. But some term is needed which may be applied to them all in common. For certainly all these facts, considered as psychology studies them, really have something in common. We will now call that which belongs to them all in common, by the name "consciousness;" and will leave the question as to what is meant by consciousness to be answered more particularly, if this is possible, later on. Attention, perception, memory, imagination, thought, feeling, and choice, may then all be called "forms of consciousness." Or, better, attending to anything, whatever it may be, perceiving anything, whatever the perceived object may be, remembering anything, whatever the particular thing remembered

may be, etc., are all activities or "states of consciousness."

But it is *we* that are conscious in all these different forms; it is *we* that perform all these different activities, or exist in all these different states. To ourselves, regarded as capable of being conscious and as actually being conscious in all these different forms, the name "Mind" (or "Soul") may be given. And then the adjective "mental" (or "psychical") may be applied to all these same facts, activities, and states. All of them taken together may then be spoken of as our mental life, as the life of the Self, or Mind.

Definition of Psychology.—What has thus far been said may now be summed up in the following definition: *Psychology is the science of the facts or states of consciousness, as such, and thus of the life of that subject of the states which is called the Self, or the Mind.* As a science, it must not only describe the facts, tell what they are, and how they are distinguished from each other as like or unlike, but it must also explain them by showing under what conditions they occur, what order in occurrence they follow, and how the more complex and later ones depend upon those which are simpler and earlier. Psychology therefore aims to describe and to explain the *growth* of mental life.

How to Study Psychology.—The question of Method in this science, as in any other, is simply the question how best to find out what the facts are, and then to explain them. But the very nature of the facts

with which psychology deals makes its method peculiar. The only way to find out any class of facts, as facts, is, of course, to observe them; in order to describe them as they actually are, as well as to explain them in the form in which they require to be explained, it is necessary to observe the facts accurately. Now, properly speaking, no one can observe the facts of your consciousness but yourself, whose conscious facts they are; and the same thing is true of me and the facts of my consciousness; and so of every conscious mind. For example, I may know or guess that you have the pain of toothache, or that you are happy in the expectation of a visit from a friend, by the signs upon your face or because you tell me it is so; but you alone can be immediately aware of the pain or of the pleasure. Twenty persons, or more, may see you blush or turn pale; but no one but you can observe the fact of your own conscious shame or fear or anger. What you think, or imagine, or remember, you may commit to speech or to paper, and thus inform others about the character of your *states of consciousness;* but you alone of all the people in the world stand face to face with them, as states of *your* consciousness.

Self-consciousness or Introspection.—The immediate awareness of one's own states of mind is called "self-consciousness." And no other way of direct observation is possible for those facts with which psychology deals. It has already been seen (p. 6f.) that these facts are facts of consciousness; subjective facts they were also called, because they had to be thought

of as having one subject for them all, the so-called "self," or mind. And it now appears that the only method of direct observation is similar to the facts to be observed; the method also may then be called subjective. In plain language, this only means that every person knows his own thoughts, feelings, plans, etc., as his own, and in an immediate manner, which is impossible for any one else than the subject of those same thoughts, feelings, and plans. Or because this seems like the work of a sort of eye that looks directly in upon the conscious life, while all other eyes only see the signs of that life, this kind of observation is sometimes called "introspection" ("looking inward").

Sources of Psychology.—To *explain* the facts of consciousness is a very different thing from simply to observe them. And, indeed, most people give so very little attention to their own mental life that they can scarcely describe clearly what its most obvious facts are. This peculiar kind of observation, which the science of psychology requires, like every other kind of observation, is also a matter that may be cultivated, and in which different people have very different natural gifts. Nothing is more common than the experience which makes us aware how much better some understand their own thoughts, memories, and plans than others do. This difference is certainly not wholly due to a lack of power in certain minds to use language well; it is also partly due to deficiency and lack of practice in self-observation. Moreover, practice makes perfect

here as everywhere else. We all may grow in self-knowledge as in every other form of knowledge. Thus it comes about that certain individuals acquire rare skill in observing, describing, and untangling all the intricacies of their own conscious states. They, too, thus become fit to describe and explain the conscious states of others far better than can the subjects of these states themselves.

The next thing to be noticed is that all men constantly and inevitably give external signs as to what their own states of consciousness are. Only in this way can men communicate with each other at all. Everything that any man does or says may thus become a means by which others know, or guess, his facts of consciousness, the character of the flow of his mental life. Now, all these manifestations of consciousness become *sources* for the student of psychology. For, we repeat, all that any man does and says may be considered as a sign of his mental life. Psychology, then, studies the facts of infant and child life, and even of the life of the lower animals. It observes the behavior of idiots and of insane persons, of criminals and of persons in natural or hypnotic sleep; just as the physiologist learns about the behavior of the organs of the human body by studying them when they are acting in an unusual or diseased way. All literature, too, is of course the expression of human thought and feeling. And so the student of psychology learns much from observing the pictures of life which great writers of dramas and novels—like the "Antigone" of Sophocles,

or the "Hamlet" of Shakespeare, or George Eliot's "Adam Bede"—have drawn. Some biographies also afford valuable sources of psychological science.

Experiment in Psychology.—Some of the facts which psychology studies can be subjected to experiment; by this it is meant that they can be produced at will, and in such way as the more easily and carefully to observe and minutely to explain them. Among these experiments a great many can be performed by any one upon himself. Thus any one is able, not only to acquire the habit of observing his own mental life as it flows on spontaneously, but also to direct its flow in certain channels for the express purpose of observing the conditions that govern it. For example, one can close one's eyes and see whether one can, by willing it to be so, make a colored cross or circle appear before one. Or we can assist each other in experimenting to see, for instance, how far apart the points of a pair of dividers must be in order to be distinguished as two, when we are blindfolded, on the different areas of the skin. Other experiments require very elaborate apparatus, such as will measure time to the one-thousandth of a second. Hence psychological laboratories are being founded, of which there are already twenty or more in this country.

Yet, again, the student of psychology, by taking the simpler movable pieces of apparatus around with him, may experiment upon a large number of persons; or by sending out circulars with questions to be answered (although this latter mode of inquiry

gives very doubtful results, since it is impossible carefully to guard the conditions of such experiments). A good example of this sort of experimental study of the mind is to be found in the work, during the past year, of a Yale graduate student, who, with simple but skilfully devised apparatus, tested thirteen hundred school-children to see how their powers of discrimination developed in dependence on age and height and sex, etc.; and how the estimate of their teachers respecting their brightness or dulness corresponded with his results.

But, plainly, much of our mental life cannot be subjected to experiments in this way, or, indeed, in any manageable way. How, for example, should one test, with laboratory methods and apparatus, the higher and more complex feelings and choices, the thoughts about duty and God, and the elaborate plans we form, for to-morrow or for our entire lives?

Method in Psychology.—After the facts and simpler conditions of mental life are ascertained in the ways that have been described, the method of building up the science of psychology does not differ greatly from that which the other sciences employ. That is, we use "hypotheses," or shrewd guesses at the most probable explanations; we derive "laws" from the careful study of great numbers of facts, and then test the laws by experiment, or by trying to explain by them newly discovered facts; and so gradually we arrive at a more complete picture of the whole development of mental life and of the conditions on which it depends.

The Faculties of the Mind.—When one begins to consider the different facts of mental life in a way seriously to study them, one is at once impressed with their great variety. One class of these facts, however, separates itself pretty readily from the others; and this is the knowledge obtained through the senses. What belongs to all such knowledge in common seems to be just this, that it all *comes through the senses.* But how really different are the impressions of the different senses! And what real likeness has the blueness of the sky to the smell of a rose; or the redness of the rose, even, to its own soft, velvety feel and delicate perfume? And in the case of the same sense: how is the smell of the rose like that of asafœtida, except that both impressions are received by sniffing in the air through the nose?

Now, however, let it be considered that all these impressions of sense cover only one part of our mental life. There are our thoughts, which are *about* so many different things, partly about impressions of sense and partly of quite another order. There are also our feelings, which are not all of the bodily kind, or such as go with the use of the senses; but are some of them of an ideal order, such as occur when we are reading admiringly of the heroes of the past, or are grieving over lost opportunities, or are craving lovingly the friendly presence of some absent companion, or are thinking of the heavenly joy of some one already forever departed. How indescribably manifold are our feel-

ings! It is just this, in part, which makes them so hard to tell to others.

The word "faculties" is commonly used for the principal modes of the activity of the mind as they are experienced in adult life. Such are, for example, perception, memory, imagination, thought, and the like. But these are all complex and highly developed forms of the same mental life; and, as we shall see, they all involve one another in a complicated way. Thus we cannot have perception without previously having developed and actually using at the time the powers of memory, imagination, and even thought. Again, we cannot think without remembering while we think; neither can we plan or choose without both thinking and remembering. And yet in all these faculties, so called, the mind is one; it is *I* that perceive, remember, imagine, think, feel, and choose. So that *by "faculties" we understand nothing but the various complex and developed modes of the mind's life.*

However, if we consider any one of our mental states, our particular modes of being conscious, we shall find that it always presents three sides or "aspects," as it were. In other words, we always find ourselves perceiving or thinking ("intelligizing") about something, feeling somehow, and doing somewhat. It may be said, then, that "intelligizing," feeling, and willing are the three elementary forms of all mental life. Yet here, again, it is we that exist, always as in some state of existence, with these three aspects in which our state may be regarded. And

sometimes, as everybody knows, the intellectual aspect is more prominent, sometimes the feeling aspect, sometimes the aspect of willing. It is this which is properly meant when Intellect, Feeling, and Will are spoken of as the three "Faculties" of the Mind.

Benefits of Psychology.—With persons who have any intelligent views about the matter, it is needless to argue the benefits of a scientific study of the human mind. Only with the aid of psychology can one to the fullest possible extent reap the benefits of the study of other forms of science. Language cannot be understood, literature cannot be appreciated, read, and interpreted, art cannot be profoundly comprehended, and even the natural sciences cannot have their full import revealed, without a knowledge of the mind of man. And, indeed, how could this be otherwise, since all science itself is only the product of the human mind?

The practical benefits of psychology in influencing the science and art of education, the management of child-life, the instruction of idiots, the improvement of the vicious, criminal, and insane, are becoming more clearly recognized with every year of its present rapid advances.

CHAPTER II

CONSCIOUSNESS AND ATTENTION

In defining psychology (p. 7) it was said that it is "the science of the facts or states of consciousness as such." And it had previously been said that the word "consciousness" may be used so as to cover all the different kinds of facts which belong to the *mental* life—at least, so far as it is an object of observation and study. Still later we spoke of self-consciousness, or the attentive consideration of our own conscious states, as a mode of observation that must be employed to reach the facts which psychology investigates. But now the question may properly be asked: What is meant by the very words, "consciousness," "self-consciousness," and "attention"? A brief answer to this question will occupy us in the present chapter.

Meaning of the Term Consciousness. — Only a moment's thought is necessary to make it clear that, if the word "consciousness" be used to signify what is common to all the facts of mental life, and so to define psychology, this use of the word itself cannot be defined. This is true, for the very good reason that no more general terms exist by which to define this one. Such a result is no fault of the language which the science of mental life employs. For all

definitions have to go back to terms that are too general and simple in contents to be themselves defined. What it is to be conscious can be so described, however, as to make it perfectly clear to every one who will appeal to his own experience. As one sinks gradually down into sleep, one becomes less and less conscious; as one wakes up gradually from sleep, one becomes more and more conscious. If one dreams in sleep, then one's dream is a form of consciousness; but if one ever sinks into perfectly dreamless sleep, then one becomes unconscious. When a man receives a severe blow upon the head, or is badly choked, he becomes unconscious. When he "comes to," he becomes conscious again; it is consciousness "to" which he comes, as we figuratively say. When one is very much alive mentally —"wide-awake" and in the highest use of one's powers, as is sometimes said—then one is highly conscious. *That which rises and falls thus, that which is partially lost in almost dreamless sleep and wholly lost in swooning "quite away," that is consciousness.* We see then, again, that this use of the word makes it a term for any and every fact of mental life, as such—as mere fact of mental life.

State of Consciousness.—We must also appeal to experience to make clear what is meant by a "state of consciousness." Actually, there is no part of the mental life that can be separated from the rest, and have an existence apart, as it were; or that can be made the subject of investigation, as thus separated, even by ourselves, whose state it is. The thoughts,

feelings, and purposes flow on in something like a continuous stream. This is why the mental life is sometimes called "a stream of consciousness." If the attempt is made carefully to observe any of the particular thoughts or feelings, then this very attempt results in changing the character of these thoughts and feelings; and at once a new and different state takes the place of the old. Still we know that we can by our own activity consider a portion of our experience *as though* it were separable from the rest; we can note its characteristics, and observe its relations to the rest of the mental life. Thus, for example, I can know that a moment ago my tooth was aching horribly; that now the pain is less intense; and, presently, that it has stopped, and that I am looking out of the window at the passers-by, or thinking of my neglected work, or planning to start on a journey to-morrow.

By a "state of consciousness," then, we mean *such a portion of the actual conscious life as we can, by our own conscious act of discrimination, consider as one, both with respect to what it is, and also with respect to its relation to other states of the same mental life.*

Field of Consciousness.—Other terms may be suggested to show the different respects in which the different states of consciousness vary, in a more or less figurative way. Among such terms is the word "field." If we consider attentively any one state of mental life, and compare it with others which are very greatly unlike it, we shall see what this figure of speech really means. Sometimes the mental life

has a much greater richness or variety than at other times. For example, at one moment I may be "all occupied" in *one* thing for a considerable time; "absorbed in" some one idea, or "overwhelmed" with some pain, or "taken up" with some joy. At another time an unusual *variety* of objects seems to be so rapidly noted and compared, that the total impression of their likeness and unlikeness constitutes one state of varied observation. Such a "field of consciousness" might be said to have a greater *extent*, or wider *circuit*, than others. This is, however, a matter of degrees; for—as will be seen later on—all mental states are complex to a greater or less degree. Again, and especially if we are in a condition of strong feeling, the *intensity*, or amount of our selves, of our actual mental life, entering into the particular state is much increased. Thus states of predominating pain are more or less intense; and even our thinking processes and activities of will seem much more vigorous, as it were, at some times than at others. The *speed*, too, with which the different states follow each other varies greatly. We seem to get over more ground in thought, or live through more feeling, or do more planning, in some rare moments of our lives than in the whole of ordinary hours. And, finally, the *character* of the different fields of consciousness varies greatly. Some of our states are chiefly states of knowledge, others of feeling, others of willing. And in each of these three classes we recognize distinctions which lead us to speak of some of them as nobler or higher than others.

It appears, then, that *the fields of consciousness differ among themselves in respect of* (1) *extent*, (2) *intensity*, (3) *speed, and* (4) *specific quality or character.*

Extent of Consciousness.—The number of impressions which can be "grasped together" and united by the mind into one field of consciousness varies, of course, for different individuals, with different conditions of body and mind, and with different degrees of the same individual's development. The story is told of one poor stupid soldier, for example, who never could be made to remember together more than two of the three substances out of which gunpowder is made. How different this from the mental grasp of the most gifted and highly trained minds!

This is one of the questions which can best be subjected to experiment. And experiment shows that fifteen or sixteen successive impressions of sound can be so grasped together as to allow of distinguishing the field of consciousness which unites them from another field similarly constituted. If a number of objects are briefly displayed to the eye, it is found that five or six are as many as most persons can clearly distinguish. The same number of impressions, or in some cases even eight, when made by simultaneously pressing different areas of the skin, can be received in one field of consciousness.

Intensity of Consciousness.—If consciousness is conceived of as a sort of mental energy, or an amount of mental life, then the different states may be

spoken of as having "more" or "less" of it. Pains and pleasures, for example, are commonly regarded as great, or moderate, or small. So men's convictions, hopes, fears, and expectations may be considered as varying in intensity. The amount of effort which is put forth in some deeds of will appears far greater than that put forth in other deeds of will. And even different ideas (though this has been disputed) plainly vary in vividness.

Speed of Consciousness.—Experiment has clearly shown—what observation of our ordinary experience suggests—that it takes time even "to come to consciousness," as it is customary to say. There is probably a certain amount of time which is most favorable for every person to reach the highest stage of the activity of the mind; and for some persons this time is markedly shorter than for others. This period is increased when the complexity of the mental acts to be performed is increased. For example, it will take the average person from one-tenth to two-tenths of a second, after an impression has been received upon the eye, to touch a key connected with an electrical current and so record the fact of the impression having been received. But if it is required to be conscious, whether the impression is that of red, or of blue, or of green, the time required may be twice as long. About three-quarters of a second is with most persons the time for "making up one's mind" most accurately in a not too complex case of judgment.

The rate at which the discernibly different states

of consciousness follow each other also differs greatly in different individuals and at different times. Some are constitutionally slow, others rapid in mental movement; but no one can be more than about so slow or about so fast.

Character of Consciousness.—The differences in the complex character of our different conscious states have already been referred to sufficiently. It is chiefly this which makes us speak of them as really *different* states; as, for example, of perception, memory, imagination, hope, joy, deliberation, etc.; or of knowledge, feeling, or will.

Conditions of Consciousness.—There are certain physical conditions on which being conscious at all is known to depend, and which also determine largely the character, intensity, and time-rate of consciousness. The most important of these is the character of the blood circulating in the brain. If the pure arterial blood is shut off from the brain, consciousness ceases. If only impure blood is brought to the brain, then consciousness is impaired or troubled; the extent of the mental grasp may be diminished and its intensity and speed of movement lowered. There are also reasons for supposing that all consciousness implies the destruction of the tissue of the brain, and then its restoration by nourishment brought to it in the blood. And the more intense the activity of consciousness, the more rapid the decomposition of the tissues of the brain. Intense emotions are especially exhausting to the brain: and "whipping up" the train of ideas to a more

rapid than their natural pace is almost equally so. Surely this is something which we Americans need to keep constantly in mind. "Living fast" is no unmeaning figure of speech here; it is only another name for letting death continually get the start of life.

And would you know how marvellously complicated and delicate is this mechanism of the brain, on whose integrity and continued sound working all the life of consciousness depends? Why, then, believe me, there is something almost incredible about this. All the stars in the universe, so far as modern astronomy can reveal them, are few in number compared with the nervous elements concerned in the working of a single brain! And as to the delicacy of this wonderful piece of apparatus: one observer claims that the passage of a cloud over the sun will change the rhythm in breathing and the pulse-rate of a sleeping child; and if we expose the brain, its whole bulk can be seen to swell when a lamp is approached to the patient's eyes. The incredible delicacy of some of the senses can be accounted for only as it is due to the delicacy in structure of the brain.

Attention.—What is called "attention" is the principal mental condition which determines the entire character of every field of consciousness. *For all our conscious states are characterized by some degree and kind of attention.* Even our "inattention," so-called, if there is any consciousness of anything left, is really attention to something else than that to which, or, in some less degree, than that in which, we ought to

be attending. The idle school-boy is *not* now attending to his lessons, because he *is* attending to something outside the window, or to his plans for trout-fishing next Saturday afternoon. Even when it is a case of being boxed on the ears, or of having fallen down and bruised our shins, we recognize the effect upon our total condition of consciousness from the attention we are compelled for a time to give. This is what is meant when it is said to children that are crying from similar pains: "Do not mind it and it will not hurt you so much." Indeed, it often happens that they themselves become so much interested in their own crying as quite to forget the pains which originally caused it. And every skilful nurse or mother knows the effect of drawing off the attention and fixing it upon a lump of sugar or upon the promise of a treat to-morrow.

Distribution of Attention.—Now, since every field of consciousness is more or less complex, all of the attention cannot be given at the same time to any one part of it, or to any one object of the several which are grasped together to make up that very field. Moreover, while the objects remain essentially the same, we may attend, now chiefly to one, and now to another, of the several objects in the same field. And still further, as the stream of consciousness flows on, and one state succeeds another, attention may become fixed upon new objects of sense or upon new states of thought and feeling of our own. This constant variation in the amounts of attention given to the different objects in each state, or to the differ-

ent states considered as wholes, is called the "distribution of attention."

Rise and Fall of Attention.—But the total amount of attention is by no means the same for all the different mental states. And as has just been seen, the amount of attention "fixed" upon any one thing constantly varies. Indeed, it is not possible to hold the attention at a perfectly steady strain for as much as a minute, or for half that time. All attention is more or less inconstant; often it is rhythmical, rising and falling off with considerable regularity of period.

If, for example, we hold a ticking watch at the right distance from the ear, in spite of all our efforts some of the ticks will drop out of consciousness. This is not because the intensity of the sound actually made varies so much; it is rather because we become relatively inattentive every few seconds. If we look at a gray disk revolving, it will appear to be now somewhat lighter and then darker, for the same reason. Some experimenters have found different periods for the fluctuations of different kinds of sensation; for instance, 3 to 3.4 seconds for sensations of the eyes, and 3.5 to 4 seconds for those of the ear. Our memory-images oscillate in the same way; and so, apparently, does our maximum power of giving attention. At any rate, in learning anything "by heart," in spite of our best endeavors, we learn best "by spurts," as it were.

Conditions of Attention.—Since attention *is* the amount of mental energy, or energy of consciousness,

devoted to all, or to each one, of the objects in the field of consciousness, the condition of the brain is very important in determining the attention. *Attention implies work being done in the brain; and attention is itself indispensable to all mental work.* The waste of the brain's tissue has been found to correspond in some sort to the amount of mental work done with accompanying strain of attention. The change in the character of our breathing when we are very attentive, the sigh we sometimes give after we have been "breathless" with attention, all point to the exhaustion of the nervous centres. A person strictly attending to any object will sometimes sweat copiously even when sitting still in a cool room. Good blood, abundant sleep, and a sound, well-nourished brain are particularly required by those who wish to be able to "attend to" their work, whatever it may be.

Kinds of Attention.—There are ordinarily said to be two principal kinds of attention,—the voluntary and the forced or involuntary. In somewhat extreme cases of either kind this distinction is not difficult to observe. Sometimes our experience is that of being *forced* or compelled to attend; and this happens when strong sensations and highly painful or pleasurable feelings are aroused from without in our own consciousness. Who can help attending—one might ask—to the noise of the piano that goes with a crank, or to the pain of the sting from a bee? And yet "absent-minded" people have been known to be so absorbed in attention to their own thoughts as to

hold a hot poker in their hands and never "mind" the pain of burning. Sometimes, however, *we choose* to attend to this rather than to any other thing; we consciously and designedly repel solicitations to attend to anything else; we bring our mind back again and again from its wanderings and deliberately fix it upon the chosen object.

In fact, however, this important distinction turns out to be one wholly, or chiefly, of degrees. Even in yielding attention, whether impulsively or more smoothly and quietly, we feel that we are doing something. And there is plainly a passive side to all our states, even when we are most "free" in determining to what our attention shall be given.

Attention and Discrimination.—The degree of attention we give, whether forced or voluntary, has much to do with our noticing distinctions; and, indeed, with the very existence of our sensations and ideas in their varied forms. It also determines largely how we shall interpret our sensations. Repeated acts of attention "clear up" any object. Thus if a disk, having on it differently colored spots or lines or different letters, be displayed a brief time, the utmost attention will on the first trial enable us to discern perhaps only some three or four of these objects. But soon by repeated acts of attention a larger number of the objects is clearly seen after the disk has been displayed for the same length of time.

What is called "expectant attention" has also a great influence on our mental states. If one knows about what is *going to be* seen, or heard, or felt, one

can in the same amount of time actually discern much more clearly what *is* seen, or heard, or felt. If I have expectant attention focused to hear some sound, then I am ready to discriminate, by attention, whether the sound is *a* or $a^{\sharp}$, or whether it is the sound of a violin or of a cornet. Expectation will even create sensations; thus in the laboratory it is easy to make most persons feel a wire to be warm, for example, when its temperature is not actually raised, if only they are deceived into *thinking* that a current of electricity is now passing through the wire. Many illusions are explained in this way; what is expected—especially if it be with fear or hope—that is likely to be actually experienced. Almost any person seems to be the approaching form of our friend, if we are looking for him with expectant attention.

Attention and Feeling.—The effect of the feelings on attention is one of the most familiar of all experiences; it is also one of the utmost practical importance. It would not be a wholly unmeaning figure of speech if it were to be said that the different objects of sense, as well as the different ideas, are always involved in a sort of "struggle for existence." They are all striving together for the mind's attention. But other things being at all equal, those get the attention, and so survive over the others in this struggle, that are most *interesting* But "interest" itself is a form of feeling. Any form of interest will serve this same general purpose. It may be that the thing which awakens the interest is

"horrible," "disgusting," "repulsive," or that it is "pleasant," "agreeable," "attractive." Thus one sometimes sees groups of children gazing with attention transfixed upon the very things that fill them with terror. The novel-reader cannot tear herself away from the dreadful story. More than half the power to get themselves read, which the details of accident and crime in the newspapers possess, comes from this psychological principle. Teachers know, as do also showmen and street-pedlers, that it is necessary to excite the feeling of interest in order to secure attention. In some cases of insanity the patient comes so under the power of some supremely interesting idea that he cannot force himself away from it, no matter how painful and horrid the idea may be.

Conversely, as we have already seen (p. 24), our feelings themselves depend for their duration and intensity very largely on the way we attend to them. The lessons of the greatest practical importance, which follow from this relation of attention to feeling, are almost too obvious to need mention. Nothing in the care of our own lives, or of the lives of others, requires greater study than how to enlist the best and strongest feelings on the side of attention to the most important and valuable subjects.

Attention and Will.—It has already been pointed out that attention is never wholly passive; it is always, in one aspect, a form of our own doing. It is therefore always, in some sort, *a manifestation of will*, in the widest meaning of this word. And in the

form of the most truly "voluntary" attention, it seems to be one and the same thing with what we call "will."

Nature of Attention.—We are now in position better to understand what is meant by this important word "attention." Plainly, it is not to be thought of as some one faculty that can be separated from the others; much less as a sort of abstract power set apart from ourselves as alive and active. It is rather a most general form of all our mental life. *I attend to everything in mind, and I mind everything to which I attend.* In other words, that distribution of the amount of mental energy to the different parts and objects in my field of consciousness, which is partly, but only partly, under my conscious control, and which is so dependent on the feeling of interest, *is* attention in its most primary form. *Only if this be so can I learn to choose, within limits, what I will mind, and really to mind that to which I choose to attend.*

Self-Consciousness.—It may now be made somewhat clearer what is meant by "self-consciousness;" and what is the difference between consciousness and *self*-consciousness. The former word has already been said (p. 16f.) to stand for every kind of mental state, every form of the life of feeling, knowing, and willing, as distinguished from unconsciousness, which is just the absence, or ceasing to be, of every kind of feeling, knowing, and willing. But it has also been shown (p. 18) that we ourselves know what these states, these feelings, thoughts, perceptions, plans, etc., actually are, only as we are conscious

of them. That is, the facts which psychology studies are all facts of consciousness, as such. But they are all immediately known by ourselves only as we are *self*-conscious.

It appears also that we must attend in order to know any object whatever in the stream of consciousness. This is as true of our own thoughts, feelings, and plans as it is of trees and horses and flowers. But sometimes attention is directed upon things and happenings "outside of" our mental life; and only sometimes is it much directed upon "our own" thoughts and feelings and plans. And thus the distinction arises between consciousness and self-consciousness. For example, sometimes I am watching a team passing, or looking at something under a microscope, or viewing the trees in my garden, or studying a lesson, or observing a landscape or a picture; then I am conscious—highly so; I certainly am not half-conscious, as in dreams, or unconscious, as in a fainting-fit. But, at another time, I am watching just as carefully my own sensations, griefs, joys, or ideas and plans as they form themselves and come and go; then I am self-conscious—highly so.

But the rest of this subject must be left to be more fully understood later on.

CHAPTER III

SENSATIONS

THE states of consciousness plainly depend upon the condition and action of certain important parts of the body, and upon the way these parts are related to external things and to the forces of nature. For example, one is consciously in quite a different condition when one is in a dark room, or with one's eyes closed, from that which one experiences in the light with wide-open eyes. Consciousness is also greatly modified when a train of cars rumbles by, a door slams, or a peal of thunder occurs; and it is modified in a still different manner when a load is laid upon the back, an insect creeps over the skin, or a hot whiff of air from the furnace strikes us. But all such forms of change in the conscious states come, as abundant experience proves, through the action of the senses, such as the eyes, the ears, and the skin.

Nature of Sensation.—It can never be told, from a direct inspection of consciousness alone, what a *simple sensation* is. This is true for the very good reason that no one ever has an experience of simple sensations, as such. For example, consciousness never consists simply of the feeling of blueness or redness, or of heat or cold, or of sweetness or sourness. But

I may see some object that is blue or red; or I may touch some thing that is hot or cold; or I may taste some substance that is sweet or sour. Yet it has already been said (p. 7f.) that psychology studies states of consciousness, as such. The sensations, as psychology considers them, may then be defined as *those peculiar modifications of consciousness which are experienced in the use of the organs of sense.* And how modifications of consciousness can be at the same time qualities of objects, so that we can call the sky blue, the iron hot, the sugar sweet, it must be an important part of the study of mental development to make clear.

Origin of Sensations.—Strictly speaking, so far as psychology regards them, sensations originate in consciousness. They *are*—as has already been said—just this: peculiar modifications of our conscious mental life. But ordinarily they do not arise unless some of the organs of sense are excited by certain of those manifold forces of nature which are adapted to excite them. We say they do not *ordinarily;* for sometimes persons see sights, hear sounds, smell odors, and feel touches that are not caused by any excitement of the external eye, or ear, or nose, or skin. Sometimes, also, the excitement of memory or imagination becomes so intense that its object is, as we say, "projected into space," and can no longer be distinguished from a real object of sense. But, ordinarily, sensations of light and color arise when the light reflected from colored objects strikes upon the eye; sensations of sound, when the

sound-waves from vibrating bodies beat upon the ear; sensations of smell, when the particles floating off from smellable substances are drawn over the skin of the nose. These outside means of exciting sensations are called "external stimuli." When sensations are excited by causes operating directly within the brain they are said to be due to "internal stimuli."

Classes of Sensations.—It is by no means so easy as is ordinarily supposed to tell how many distinct kinds of sensations there are, and to assign each to the right class. The popular classification into the *five senses* of smell, taste, hearing, sight, and touch is plainly inadequate. For—to give instances: what is called the "taste" of things taken into the mouth really consists largely of smell; what is called the "look" of things is partly touch; and what is called "touch" is always a compound of various sensations. There are also many obscure modifications of consciousness which are due to the excitement of the mucous membrane, and perhaps of the muscles, inside the body; while the excitement of the skin on the surface of the body gives rise to several distinct kinds of sensations. Even within the limits of what is styled the "same sense," there seems often to be little real likeness among the different modifications of our conscious states. Why should sour and sweet, for example, be said to belong to the *same* sense, except that they both come through the tongue; or heat and cold, except that both come through the skin?

The principle on which the popular classification is based considers simply the different organs—nose, tongue, ear, eye, and skin—through whose excitement the sensations are produced. Now, if we retain this principle of classification, and divide the sensations of the skin into the two great unlike classes which this organ produces, and then add two other important kinds which recent study has discovered, we shall have the following list: Sensations of Smell, of Taste, of Sound, of Light and Color, of Pressure, of Temperature, and of the Muscles and Joints. Each of these will now be considered very briefly.

Sensations of Smell.—These sensations are produced by exciting certain nervous structures that are situated in the lining of the upper region of the cavity of the nose. The stimulus is drawn in with the current of air (hence the intensity of smells is increased by "sniffing"); it consists of extremely minute particles which are called "effluvia," and which are thrown off from odorous substances. Long ago it was noticed that very small bits of camphor on the surface of water have a curious rotary motion; something similar has now been observed in the case of several hundred smellable substances. Dogs cannot "track" game if paper is tied in front of their nostrils.

Chemists do not as yet know much about the chemical causes of the different smells occasioned by different substances. And no means of classifying smells exist except by mentioning the names of the

things which produce them: as the "smell of a rose," or the "smell of sulphur;" or by speaking of the invigorating or depressing effect they have upon us. Smell is in general the most animal and the least intellectual of all the sensations.

Sensations of Taste.—It is the tongue, and in some cases the front part of the soft palate, by whose activity sensations of taste are occasioned. Ordinarily the stimulus is applied by pressing it against the nervous structures in these parts, after it has been dissolved in the saliva or in some other fluid. We know almost nothing about those qualities in different tastable substances which fit them to excite the different sensations of taste. Among the principal kinds of taste are the sweet, the sour, the salt, the bitter, the alkaline, and the metallic. Much of the "shading" of these sensations is due to the smells which accompany them; as, for example, in the so-called "taste" of an onion, of chocolate, or of the different kinds of fruit.

Sensations of Sound.—These sensations are usually occasioned by sound-waves in the air striking upon the drum of the ear. From the ear-drum the waves are carried, in the form chiefly of vibrations in a chain of bones, and then in certain fluids, to the peculiar nervous structures arranged in the "inner ear." But not a few sensations of sound are also produced by changes going on in the parts of the body near to the ear. Such sounds are called "entotic." Among them are the sound of the beating of the heart, of the murmur in the lungs, of the crackling

noise caused by yawning, or the low musical tone that can be heard by pressing the fingers in the ears and setting the muscles of the jaws vibrating intensely.

Kinds of Sounds.—All sounds may be divided into two classes—*tones* (or musical sounds) and *noises*. These, however, are generally mixed together and pass into each other. For few tones on the violin are not mixed with some noise, and the ax "rings" in a semi-musical way, while the harshest voice has a "pitch" of its own. If soap-bubbles of hydrogen are exploded, or stoppers pulled out of lead pipes of different lengths, rapidly enough, musical sounds may be produced. It is the rapidity and regularity of the recurring vibrations which determine the musical character of sounds. But noises are produced by vibrations which lack this periodic character.

Pitch of Tones.—We know that musical sounds are all capable of being arranged in a sort of scale. Their quality is such that some of them seem to be—as the phrase goes—"higher" and some "lower" than others. The *pitch* of tones depends upon the rapidity of the vibrations which cause them; the higher the pitch the more rapid the vibrations. If two tones, that are some distance apart, are sounded one after the other, then the ear will enable us to put another tone in between them, as it were. This seems due to an immediate power of the mind to discriminate differences in the quality of tones. Such power differs greatly in different persons; but it much exceeds, in most cases, the power of the per-

son to produce with the voice the same shading in quality. Even Jenny Lind could scarcely sing in quarter tones; but ordinary and untrained musical ears will readily distinguish far minuter differences of pitch than this. For example, experiment with a considerable number of children, of ages from six to nineteen, in the public schools of New Haven, showed that their power to make distinctions in pitch varied from 12.3 to 2.4 thirty-seconds of a tone.

By the *timbre* of tones is understood that compound quality which depends upon the number, relative strength, and pitch of the simple tones which fuse together in the compound tone. The musical sounds of ordinary experience are all compound. It is by difference in timbre that any note, when sounded on a violin, is distinguished from the same note when sounded on a piano, or when sung by different voices.

Noises, apart from the tones which blend with them, have neither pitch nor timbre; they are divided into "crashing," "crackling," "hissing," etc., and cannot be arranged in a scale as musical sounds can.

Sensations of Light and Color.—The eye is the organ of these sensations. It resembles the instrument which the photographer uses—the *camera obscura;* but it is filled with fluids instead of air; its lens adjusts itself instead of having to be pulled out or pushed in by the operator; and the screen on which the "image" is made is a wonderfully delicate mem-

brane containing peculiar nervous structures. The light, even after being transmitted through the ball of the eye to the back part where this screen (the "retina") is placed, is not the immediate stimulus of the nervous part of the organ. The light only stirs up certain chemical changes in the structure of the retina, and these changes produce the nervous excitement. Nor is light the only form of stimulus for the eye; as every boy knows who has fallen on the back of his head while learning to skate, and as all may experience by pressing gently on the closed eyeball, and so exciting what are called *phosphenes*, or disks of light with darkly colored edges. If we close our eyes in the darkest room, we still see light and colors—the "*own*-light" of the retina as stimulated by the blood which reaches it.

Kinds of Visual Sensations.— All sensations produced by stimulating the eye are either of Light or of Color. That is, sensations of the eye may vary in *intensity* all the way through many shades of gray from deepest black to purest white; or they may vary in those peculiarities of *quality* which are brought out so beautifully by passing the light through a spectrum and thus analyzing it. In all ordinary experiences, sensations of color and light are blended together. In other words, every color is more or less "bright" (or distant from pure white or pure black), and also more or less "pure" (having a distinct "color-tone" corresponding to some place in the spectrum). The old division into seven colors is a mere conceit. The number of colors is

indefinitely great, and differs for different eyes, as the number of tones does for different ears.

Mixing of Colors.—The quality of the colors of the spectrum depends upon the number of the oscillations, in a second, of the waves of light which produce them—ranging all the way from about four hundred and fifty billions for red to about seven hundred and ninety billions for violet. But, as has already been said, the different colors "shade into" each other, and so their number is indefinite. The peculiar and interesting fact, however, is that by "*mixing*" a comparatively small number of selected colors, all these different shades of color may be produced. Just how many such selected colors are necessary (that is, the number of "*fundamental*" colors) is still a matter of dispute. Helmholtz would reduce them to three—green, red or carmine, and blue or indigo-blue. Others think that six such colors are required—namely, three pairs, green and red, blue and yellow, and white and black.[1]

Now, the difference between *shades* of color and distinct color-tones is not perfectly clear; neither are the limits of the analysis which the eye can perform quite fixed. For example, almost any one can tell whether a color is *blue*-green or *yellow*-green, and perhaps guess before experience that if yellow is mixed with red, the red turns orange; but few or none could predict that a little of black and of

[1] The mixing of colors can be very satisfactorily studied by use of an inexpensive top made by Milton Bradley of Springfield, Mass.; and called the "Bradley Color-top."

orange mingled with white, on a revolving disk, will appear seal-brown; and all are astonished when they first learn that purple and green, or orange and blue, or violet and yellow-green, will produce white. Colors which when mixed in pairs produce white are said to be "complementary" of each other. Some of the bearings of these surprising facts will appear later on.

Sensations of Pressure.—All the areas of the skin seem to ordinary observation alike sensitive to pressure, as such, although hard pressure upon them all is by no means alike painful. But recent experiments have shown that clear-cut and definite sensations of pressure are only occasioned by exciting certain particular minute areas of the skin. These are called "pressure-spots." Such spots are found all over the body, arranged in chains, as it were; they have different degrees of sensitiveness, and their number and degree of sensitiveness in any particular large area determines the ability to discriminating touch which that area possesses.

Sensations of Temperature.—It is one of the most astonishing discoveries of modern psychology that sensations of temperature originate through the stimulation of minute areas of the skin, and that these are different for the two kinds of temperature, heat and cold. There are, therefore, "heat-spots" and "cold-spots," and the arrangement of these is different with different individuals and for different areas of the body. Both kinds of temperature-spots have also different degrees of intensity in dif-

ferent localities. The same object feels cool to one spot and ice-cold to another. The temperature-spots and the pressure-spots do not seem ever to coincide.

The facts with regard to both these last two classes of sensations may be brought out by studying the effect of touching different areas of the skin with a fine point of cork, wood, or metal.

Muscular Sensations.—There appear to be sensory nerves which end in connection with the muscles, and which are excited by stretching and relaxing, by straining, and pressing hard upon these organs. These muscular sensations can be brought into consciousness by various experiments. If, for example, we place the tip of a finger against some firm object and then press harder and harder, we not only feel the skin-sensations creep up the arm, and the sensations due to the joints being squeezed together, but also certain sensations which lie deeper down in the muscles. Experiment also shows that muscular sensibility is sometimes lost when that of the skin is retained; and sensibility of the skin is sometimes lost when that of the muscles is retained. But, although the two are not the same, sensations of the skin and those of the muscles are constantly blended together in all the use of the bodily members. Probably muscular sensations differ only in rather a gross way among themselves; so that they serve to measure relatively large amounts of movement only. An exception must be made, however, in the case of the eye, whose mus-

cles are capable of being trained for astonishingly fine discriminations.

Sensations of the Joints.—The pressure and rubbing against each other of the membranes which line the joints occasion sensations that enable us to know how our limbs are placed. Thus one experimenter found that a man with his hands held fast in a plaster cast could perceive a very small bending of the first joint of the finger when done by some one else. And if one notices carefully, one can discover how the sense-consciousness changes with the increase or the lessening of pressure at the different joints of the body.

Organic Sensations.—There are a great many obscure and mixed forms of sense-experience that originate in the condition and changes of the heart, of the lungs, the intestines, and other internal organs. Other sensations, having to do with the perception of the body's poise and balance, have been traced to certain parts of the ear; for everybody knows how important the feeling of the position of our own head is for our judgment about the position of the entire body and of all things in relation to it.

In brief, we see that our sense-experience is much richer and more varied than is ordinarily supposed. Indeed, it is indefinitely rich and varied, different for different individuals, and constantly growing with the cultivated use of the organs of sense.

Causes of Difference in Sensations.—This indefinite number of sensations depends for its excitement

upon a number of varying causes. Or, in other words, the qualities of the sensations vary in dependence upon a variety of changing conditions. We shall now consider some of the more important of these conditions.

Sensations and the Organism.—It has been seen (p. 36f.) that, ordinarily, sensations depend upon the excitement of the organs of sense by some form of external stimulus. But the relations between the particular sensations and this excitement of the organism are very complex. Thus *the sense-experience of every individual is, so far as range of quality in each of the senses is concerned, peculiar to that individual.* Among the varying conditions of the sensations are certain natural or acquired *characteristics* of the organs. Some persons have "no ear" for music, as is said; they are "tone-deaf," and cannot distinguish semi-tones, or even intervals of a third. But others can recognize two hundred distinctions of pitch between successive tones in some parts of the ordinary scale. Some can hear tones (perhaps those produced by sixteen vibrations) an octave lower than others; or two octaves higher than the ordinary ear. Some are "color-blind;" and such unfortunates have been divided into two groups, the "red-blind" and the "violet-blind" or "green-blind." An indefinite number of partial deficiencies in the color-sense must also be recognized. Experiment upon 1,300 school-children in New Haven has shown that the power to distinguish fine differences in shades of red grows, in general, pretty uniformly with the age.

Similar differences in smells, tastes, and muscular and skin sensations exist.

The *part* of the organ to which the stimulus is applied has also much to do with the quality of the sensation produced. This has already been seen (p. 41f.) to be true of the heat- and cold-spots and of the pressure-spots. If we hold our eyes steadily fixed in front of us, and move a red-covered book into the centre of the field of vision and then out again, we shall see that its color changes greatly; this is because the image made by the same object varies in color as its position is moved from the centre to the outside of the retina. One observer found that red could thus be made to become orange, then violet, and then blue. The different parts of the retina are also differently sensitive to brightness or amount of white light.

The quality of the sensation also depends upon the *condition* of the organism as due to excitement that has just previously taken place. Smells and tastes, when they follow each other closely, influence each other greatly. A smooth surface feels smoother when we have just been feeling a rough surface; a slightly rough surface rougher, when we come to it from feeling a smooth surface. But it is in the case of sensations of the eye that this principle is most important. If we look intently for a few seconds at any bright or colored object and then close the eyes, we find the "after-image" of this object going through a somewhat regular series of changes that fall under this principle. A black square on a white

surface, when the eyes are turned off on a white background, appears bright at first and then slowly fades away. Contrast of brightness and contrast of color-tones also appear. A bright object is made brighter by darker surroundings; while on a red ground, when covered with tissue-paper, it appears green, and on a blue ground it appears yellow. *Every sensation has its quality relative to the condition, just past and now present, of all the most closely connected parts of the organism.*

Quality of Sensations and of Stimulus.—It has already been shown (p. 36f.) that the way our consciousness is affected depends upon the kinds of stimulus which excite the organs of sense. Sound-waves are the natural excitement for the ear; light-waves for the eyes; effluvia for the nose, etc. But within these classes of sensations a great variety of qualities is occasioned by differences in the quality of the stimulus. For example, further, if the relation between the number of vibrations of two tones, in a second of time, is a simple one, then the result of sounding them together is a pleasing sensation of "harmony;" if not, the result is a more or less unpleasant sensation of "discord." The relation 1 : 2 gives the Octave, the most perfect chord; 1 : 3 gives the Twelfth; 2 : 3, the Fifth, and so on. As the number of light-waves increases, the quality of the color-sensations runs through all the sensations of the spectrum.

Sensations and Time and Strength of Stimulus.—The *time* during which the stimulus acts has much to do

with the sensation that results. It takes some time to start off the senses and set the mind to acting, as it were; and experiment seems to show that the different color-tones require different fractions of a second to attain the same degree of clearness. Extending the time of the impression will to some extent make up for weakness of impression; for there is a sort of "inertia" which belongs to the nervous apparatus.

The quality of the sensations also varies with their *strength;* for a strong odor of musk or of asafœtida is by no means precisely the same in quality as a faint odor of the same substances. If any color or any shade of gray is brightened, a slightly different color is made of it. Intense sweet or sour, or bitter or salt, is a different thing from the moderate degree of similar tastes. And even the same note on the piano, when violently struck, yields a different quality of sound.

Intensity of Sensations.—And yet everybody knows what a difference in mere degree or amount of essentially the same sensation is; and we all apply the terms "strong," "weak," and "moderate" to our sensations with a perfect confidence. The strange thing about this is, however, that we are so unable directly to compare the amounts of our different sensations. Who would feel sure that one red is just exactly two and one-tenth times brighter than another of the same shade; or who would make oath that the smell of the violet in his hand is precisely one-half as strong as his morning's cup of coffee? We are very

sensitive, however, to minute variations in the degree of the same kind of sensations, when they occur under certain favorable conditions; and in this way a law for measuring the relation between the quantities of the sensations and the quantities of the stimulus which causes them has been investigated with much pains.

Weber's Law.—The law to which reference was just made bears the name of this investigator; or it is sometimes called the "Law of Fechner." It affirms that the amount of our sensations does not vary *directly* as the amount of the stimulus which occasions them; but, on the contrary, that if we wish to get any appreciable increase in the sensation, we must add to the stimulus which produced the sensation a constant proportion of the whole amount of stimulus. For example, suppose that I can tell the difference between the pressure of 30 ounces and 31 ounces; then, if I change to *pounds* of pressure, it will not do to add simply one ounce in order to produce an appreciable change, but 1 pound must be added—that is, the same proportion of pounds as was previously necessary of ounces.

Thousands of experiments in every kind of sensation, under almost all conceivable conditions, have been conducted in order to test "Weber's law." The result has been to show that it is only approximately true for some of the sensations; mostly for those of moderate intensity; and that, as might be expected, *a vast number of influences determine the estimate which every man puts upon the amount of his*

sensations every time he actually estimates any of them.

Limits of Sensation.—Such experiments as the foregoing have made clear again (see p. 23) the marvellous delicacy of the nervous system. What is the least stimulus that will cause any sensation at all? For some of the sensations, under the most favorable circumstances, the amount is almost incredibly small. Thus a movement of the eye answering to a contraction of the muscle of only .0006 of a millimetre can be detected. The noise made by a cork ball, weighing 1 milligram and falling 1 millimetre, has been said to have been heard; and 1 part of mercaptan to 50,000,000,000 parts of air has been smelled. In the light of these facts many of the alleged performances of mediums and hypnotic persons seem far from incredible.

Complex Sensations.—Already it has been repeatedly assumed that all our sensations are compounds. The cold feeling of any body in contact with the skin results from the "fusion" of the effects of a great many "cold-spots." The feeling of the weight of any body which is lifted or carried results from the fusion of an indefinite number of sensations of skin, muscles, and joints, belonging to different areas of the body. Indeed, when we lift heavily, we feel our own changed respiration, the panting breath, the heaving chest, the inner strain, as well as the squeezed joints, hard-pressed skin, and taut muscles. In sight we also sense the objects with moving eyes, and this gives us a variety of nicely

shaded muscular sensations. If the objects are very large, or are themselves in motion, then we have to "look at" them through the muscles of the head as we turn it, or even of the whole trunk. When we smell "horrid" strong smells or nasty tastes, we gag and make wry faces, and thus *feel* the substances as much as we smell or taste them; and every one knows the trick of "rolling a sweet morsel" under the tongue, which not only presses its solution against the taste-bulbs, but increases the "massiveness" of the pleasure by bringing in another sense.

Local Signs.—It is a plausible theory then, if not an established fact, that all the various compound sensations which arise in consciousness may differ in the complex quality of their mixture; and that this complex quality depends partly at least upon the areas of the organism that are excited to produce the sensations. Hence the complex sensations may serve as "signs" to the mind by which it judges where they are *located*. The name "local signs" is then a very convenient figure of speech. Of course, it must not be understood by this that the mind stands outside of the sensations, as it were, and thus judges them to belong to a given locality. The power of discrimination, which is mental, grows right along with the development of these complex sensations; and so they are not *mere* sensations, but are also *signs* to be interpreted into relations of things. But all this can only be explained when we come to the subject of perception by the senses.

Sensations of Motion and of Position.—The more

active organs of sense are most of the time in motion; or, if they are not themselves in motion, the substances or objects that excite them are moving over them. Hence we get a great many different series or successions of sensations that correspond to every variety of movement of the organs, or of objects over the organs. And every possible position of the organs may in turn be the point of starting on a series of movements, or of stopping after a series of movements has been accomplished. Thus, so to speak, does the mind get acquainted with the body and with all its movable organs, in every variety of positions and in all the different possible courses of its movement. How sensations of motion and of position are useful in the acquiring of a knowledge of things will also appear later on.

CHAPTER IV

FEELING

It has already been shown (p. 14f.) that we always find it possible to regard our mental life in three ways or "aspects." For we are always actually not only perceiving something or thinking about something, but also doing somewhat and feeling somehow. It is this aspect of *feeling somehow* which is now to be considered. Now, although feelings are never experienced alone, or separate from sensations, ideas, and plans, and although the character of the feelings is dependent upon the sensations, ideas, and plans, they are not in nature the same. The pain which a bright light, a discordant sound, or the memory of some loss or wrong-doing occasions, is a quite different mode of mental life from all sensations or memory-images, as such.

Nature of Feeling.—It is plainly impossible to describe what it is to feel in words so that another who has never felt a kindred form of feeling can perfectly understand it. If there are intelligences —like some of the angels, we will suppose—that have never suffered or rejoiced, been surprised or disappointed, they can never be made to know what these feelings in us are like. All description is in some

form of language; and to one who does not feelingly sympathize with its "tone" language is only the expression of conceptions and thoughts. *The very life and essence of feeling is in being felt.* This fact explains why it is that we are so at a loss to communicate our feelings; why, when they are—as we think—peculiar to ourselves, we are so lonely; and why feeling is called especially "subjective" (or belonging to the "self") and never to be conceived of as a quality of things.

It follows that all theories which simply aim to tell what are the bodily conditions of the various feelings, or what are the states of intellect in connection with which the feelings arise, mistake entirely the problem. They tell nothing as to the true "nature" of feeling. For this we must all go to our own conscious life, and find and recognize it there. But it also follows that it is difficult, if not impossible, to classify the feelings, as such. That is, every classification only tells the conditions under which, or the occasions on which, the feelings actually arise. But to know what the feelings *really are*, there is no other way than by noticing them as they are felt.

Conditions of Feeling.—The physiology of the feelings is very obscure. As to what in the nervous processes determines whether our feelings shall be painful or pleasurable, something is known; although the answer to even this problem is by no means so simple as is sometimes supposed. We shall speak of it later on. But what are the ner-

vous processes which correspond to and occasion the entire feeling-aspect of our mental life? This is an important question; but it is one that almost all students, both of physiology and of psychology, have either quite overlooked or else have answered in a far too shabby way. We shall now simply give our opinion, and let it stand for what it is worth in the estimate of expert scholars; for it would be difficult, or impossible, to make it perfectly clear to others.

There is always an excess of nervous excitement in the brain beyond that which can be so organized as to serve as a basis for clear perceptions, ideas, and thoughts. The result of pouring upon the centres of the brain such a great mixture of nervous impulses that arise not only in the organs of sense, but also in the organs within the chest and abdomen and in the lower parts of the nervous system itself, is to produce a sort of "semi-chaotic surplus" of nervous energy in these centres. But the character of the nervous excitement already going on in these centres, as well as their habits of nervous action, helps to determine the net result—as is the case with all the nervous processes that stand related to our conscious life. Therefore, *the kind and the amount of our feelings depends not only directly upon the kind and amount of the excitement in the bodily members of which we are distinctly aware, but also indirectly upon this through the relation which such excitement sustains to our general sensibility.* This is the reason why men differ so in their feelings when

they have almost exactly the same sensations, ideas, and thoughts; why feeling is, as everybody knows, so capricious and little to be depended on; why so often one cannot possibly tell why one feels as one knows one does feel, etc. But we will not at present dwell longer on this obscure matter in the physiology of the nervous system.

Kinds of Feeling.—Some authors would reduce all feeling to mere pleasure and pain. There would then be only two kinds of feelings, *as feelings*—namely, *pleasure and pain;* or—to make a useful compound word—all feeling is thus reduced to "pleasure-pain," and only this. No view, however, can contradict experience more flatly than this does; and all experience, as well as all use of language, contradicts it. There can be no doubt that some of our sensations and thoughts are pleasant and some are painful—that is, there are pleasant feelings and there are painful feelings; and whether there are any feelings which are "neutral," or neither pleasant nor painful, only experience can decide. It is also true that the word "feeling" is used in a very loose way; and thus some sensations, especially those of touch, are spoken of as belonging to the "feelings," strictly so called. Thus we say: The marble *feels* cool and the iron hot; the velvet *feels* smooth and soft, and the stone hard and rough, etc.

But in the sense in which the word is now used—namely, as that aspect which all conscious life has, that is neither intellect nor will—feeling is never to be resolved into mere pleasure and pain. Instead

of there being only these two opposed kinds of feeling, there is an almost indefinite variety of feelings. For the reason why it is difficult to classify the feelings is by no means because there are so few of them; it is rather, in part, because they are so many in kind, so variable and infinitely shaded in quality, so unlike, for very variety, at different times. Moreover, the same feeling may be either pleasurable or painful, according to the bodily or mental conditions under which it arises. For example, there are feelings of *surprise* and feelings of *expectation*, feelings of *excitement* and feelings of *repose*, feelings of *assurance* and feelings of *doubt*, feelings of *duty* and feelings of *beauty*, etc. Any one of these distinct kinds of feeling may be either pleasurable or painful, and this either in a slight or in an intense degree.

In classifying the feelings, however, it is most convenient to regard the occasions on which they arise, or the kinds of intellectual activity with which they are most closely connected. In this way we arrive at the following classification: (1) Sensuous Feelings; (2) Intellectual Feelings; (3) Æsthetical Feelings; (4) Moral Feelings. We shall here speak very briefly of some of the simpler of the first two kinds, and leave the more complex and higher forms of the life of feeling to be treated later on.

Sensuous Feelings.—When any of the senses are at all strongly affected, we are conscious, not only that these senses are conveying us some information about our own bodies or about external things, but

also that *we* are being subject to pleasures or pains. Usually these two effects "fuse together" so completely that it seems proper to speak of the sensations themselves as either pleasurable or painful. Sometimes, however, the feelings follow the sensations, so that the latter may be looked upon rather as their causes or occasions than as parts of the feelings, so to speak. Thus, for example, certain tastes and smells are unpleasant, depressing, or disgusting; and certain others are pleasant, invigorating, or exciting. Pleasant coolness is "refreshing;" pleasant warmth is "cherishing." When the larger muscles are used in a slow and regular way, we feel "grave" and "well-poised," or even "pompous" and "self-important." When we hop, skip, and jump, we feel "free" and "gay." A German professor has declared that even so sober a person as himself cannot easily feel "dignified" if he walks like a "mincing" school-girl.

It is well known that different kinds of feeling go with the sounds given out by different musical instruments and with the different musical keys and chords. A little German boy, who was allowed to choose between two trumpets which had a different tone, preferred the "darker one" (that is, the one with the lower tone). All acquainted with music distinguish readily between the subdued sweet sentiment which the minor strains occasion and the more excited and positive pleasures of the major strains. Yet all, when in certain moods, and some people habitually, prefer minor music to major.

Goethe long ago spoke of the "cheerfulness" of yellow light and of the "mournfulness" of feeling which accompanies looking through blue glass; green gives a feeling of repose, and red a feeling of excitement. The obscure and massive sensations which arise from the gross conditions of the internal organs lose nearly all their character as sensations, and become mere organic feelings, as it were. And so we speak of feeling "queer," "all-overish," and "not a bit like ourselves," when the character of the feelings is greatly changed.

Feelings of Relation.—Many feelings seem to depend, not so much upon any particular sensations, ideas, or bodily movements, as such, as upon the *relation* which the sensations, ideas, and movements sustain to each other. These are sometimes called "feelings of relation." And here the important principle is, that *the character and the rate of change which takes place in the sensations and ideas determine largely the feelings which accompany them.* For example, a sudden and abrupt change in the character of the sensations or ideas produces certain characteristic feelings of surprise or shock. This feeling of surprise may be that of a pleasant novelty; or it may deepen into astonishment, and then change into fear. The slow, monotonous flow of similar sensations or ideas is also felt as the feeling of weariness, or *ennui;* and it may then give rise to restless longing for change. The rate at which the sensations and ideas change influences the feelings greatly. We feel "excited" and "brilliant" when

this rate is increased moderately; if it becomes greatly increased, we feel as though our own thoughts were "running away" with us. Some forms of insanity are distinguished by the time-rate, as apparent to the patient himself, of his successive mental states. In "melancholia" the thoughts "drag on," and the soul feels dragged down correspondingly. But in "mania" the thoughts run helter-skelter, and we feel "wild," and as though we were at their mercy.

Feeling as Pleasure-Pain. — Although the entire nature of feeling is not pleasure and pain, most feelings have some, at least slight degree, of this pleasure-pain "tone." In using the words "pleasure" and "pain" in this way, we include under them every degree and kind of agreeable and disagreeable feeling, from the slightest uneasiness of some portion of the skin to the intensest bodily anguish; or from the uncomfortable consciousness with which we regard a "half-bad" picture to the sharpest grief at the death of a friend or the remorse of an outraged conscience. The question whether there are "neutral feelings"—or those which are not in the slightest degree either pleasurable or painful—has been much discussed. Probably it can only be answered by an appeal to the experience of the individual. This appeal seems to show that most sensations and ideas, with the feelings which are fused with or accompany them, show at least some traces of pleasure-pain, when we *attend* to them for the purpose of testing this very question. But, on

the other hand, there are numbers of our visual images or other sense-experiences, as well as of our thoughts, which have so low a degree, if any, of pleasure-pain feeling with them that this character does not attract attention; and, indeed, it cannot be recalled as connected with them. Moreover, many feelings, which once had a rather pronounced "tone" of pleasure or pain, seem, under the influence of habit, quite completely to lose it, and become "neutral;" other feelings never attract attention as pleasurable or painful at all.

Conditions of Pleasure-Pain.—It is not known precisely what it is in the action of the nervous system which makes the difference between pleasure and pain, or indeed what are the bodily conditions of pleasure-pain in general. One or two experimenters have claimed to find distinct "pain-spots" in the skin (similar to the "pressure-spots" and the "heat- and cold- spots" (see p. 41f.); but more careful observation does not bear out this claim. There is some evidence that the excitement of special parts of the nervous system (paths to the brain and brain-centres) is connected with painful consciousness. For example, disease or chloroform or hypnotic sleep may render one insensible to the pain of sensations without destroying the sensations themselves. It is worthy of notice that pain often seems to be evolved more slowly than the sensations, as such. Thus if we dip a hand into very hot or very cold water, or get a sharp blow on the surface, we have first an intense sensation of being

touched; and then afterward the pain begins to grow, as it were, in consciousness.

All biological theories which attempt to account for the pleasure-pains assume that pleasure indicates action of the nervous system which is *beneficial*, and pain indicates action which is *harmful*. But much of all this is mere theory, not at all borne out by facts. One of the most undoubted conditions of many bodily pleasures and pains is the intensity of the excitement which produces the feeling. Very weak sensations, and what we may call "thin" and "pale" ideas, are generally disagreeable; they make attention difficult and provoke us by delaying the pursuit of practical ends. On the other hand, if the intensity of any kind of sensation is increased beyond a certain limit, it tends to become painful. Intense sensations of pressure or of temperature produce physical anguish.

Again, unsteady, flickering sensations are disagreeable. Scarcely anything of the kind is more painful than, for example, to walk by a high picket fence and look through it at the sun. Such abrupt and great changes in the strength of the sensations give no opportunity for the organism to adjust itself. A similar principle seems to apply to certain "feelings of relation." What interrupts the smooth flowing of the current of conscious life, when it is set in any one direction, is apt to be disagreeable. Thus, when we are looking intently at some object, or listening eagerly to some sound, the faintest whisper or lightest touch which distracts us may

be exceedingly painful. These facts, and many others, show that we must look chiefly to the centres of the brain—their condition and habits of action—for the explanation of the conditions of our pleasures and pains. And this accords with the view already expressed (p. 53f.) as to the conditions of feeling in general; for *the way that any new stimulation "fits in with" the existing conditions of the brain, and the character and amount of the "disturbance" which it produces in the brain-centers, is the chief determining cause of pleasure or pain.*

Mixed Pleasure and Pain.—In persons who are of robust body and mind, all strong emotions are "naturally," for the time being, more or less pleasurable. It almost seems as though it were necessarily productive of pleasure to find one's self thoroughly alive in the matter of feeling. This is as true, in most men, of anger, vengeance, pride, excessive self-esteem, and other morally bad feelings, as it is of love, the spirit of devotion, etc. That is, *unless the limit of intensity of strain upon the organism is overreached, the emotions are usually pleasurable, without any reference to their ideal character.*

The question has been debated whether any sensations, regardless of intensity, are "naturally" disagreeable. Some have held that all smells, sounds, tastes, and other sensations are, so far as their mere quality goes, agreeable. But the behavior of infants would not seem to indicate this. There is, indeed, the greatest variety of so-called "tastes" developed; and certain persons seem to show from

the first what men generally are inclined to call "depraved" or "monstrous" tastes. That is, smells, tastes, sounds, and sights, which nearly all of their fellows consider disagreeable or loathsome, seem to give pleasure to certain persons. Some, for example, enjoy the smell of burning feathers or of asafœtida. Certain children, from their earliest years, appear to take a strange delight in the painful struggles of the insect which they have pinned through or whose wings they have pulled off; or, perhaps, in the sight of blood—a spectacle which others can scarcely look upon at all without growing faint.

In the actual experience of men almost all states of considerable feeling leave a mixture of pleasure and pain. The reasons for this, and for the precise amounts of pleasure and pain, and for the way the two "struggle" together to get control of the entire mental state, are numerous and obscure. But the considerations just mentioned explain much of our experience. While some sensations—such as bitter tastes, grating noises, "sickening" smells, slimy touches, as from worms crawling over the skin—are naturally disagreeable to most persons, and too strong excitements of feeling are disagreeable to all; on the other hand, most emotions of whatever kind are chiefly pleasurable, and what is far "too strong" for one person may be only a delightfully full and free tide of life for another. Thus a savage may thrust a spear through his enemy in a sort of transport of pleasurable rage. And even

good men, while the anger is strong upon them, if asked: "Doest thou well to be angry?" will answer, as the prophet Jonah did: "I do well to be angry, even unto death."

Rhythm of Pleasure and Pain.—In speaking of attention we saw (p. 54f.) that it cannot be kept at a steady strain; it rises and falls, sometimes in a sort of rhythmic way. It is partly in connection with this that pleasures and pains are always more or less intermittent, as it were. No toothache, however severe, keeps up a perfectly steady strain of pain. And, in fact, we may be for a moment rather pleased with our toothache if it is considerably less severe than it was a moment ago. The same thing is true of pleasures, especially if they are somewhat intense. We cannot hold them long at a steady pitch.

Connected with this is also the tendency to pass from a condition of pleasure to one of pain, and back again. In early life, and indeed all the way through, the soul is kept vibrating between pleasures and pains, by circumstances over which we have no control. One needs only to watch an infant being bathed to notice this fact. One instant he shudders and cries with pain, the next he glows and coos with pleasure. Nature sways him back and forth ceaselessly between the two. His experience with life and his fitness to meet it can only come in this way. And all men have to take their share in the pain as well as in the pleasure. Indeed it is a truth which poets and wise men have expressed in all

ages that the mind of man tends constantly to react from one tone of feeling to the other. This is especially so of intense pleasurable feelings: they cannot last long, and in their ceasing we are apt to fall over into the other extreme. Hence the practical maxims not to love too violently, lest disgust or hatred succeed; not to hope beyond measure, if we would escape falling over into dread or despair; not to enjoy anything in excess, lest it become particularly distasteful to us; and not to admire immoderately, lest we come unjustly to despise.

Pleasures of Rhythm.—Besides this rhythmic character of the feelings with their pleasure-pains, we may remark the pleasures of rhythm, which seem to be natural and to belong to all men. This is undoubtedly due to physiological reasons, to which attention has already been called. If the recurrence of the same excitement is just about frequent enough, it finds the centres of the brain adjusted to it, and attention is made easier as well as the comprehension of any meaning which the experience may have. In bodily movements, especially of numbers of persons acting together, these feelings of rhythm serve to heighten pleasure or to lessen the task. So sailors lifting the anchor, or workmen handling timbers, besides the advantages of actually moving together, get some pleasure out of their otherwise monotonous work. The pleasures of dancing and of marching to tune are partly of this order; while the pleasures of reading poetry or of having it read are increased in this way. So also, in part, the agree-

able feelings which arise when we move the eye easily along the ornamented lines of a building.

Effect of Repetition.—The effect, upon the life of feeling, of repeating frequently the same feelings, is not the same as the effect upon the life of thought, of repeating frequently the same ideas and thoughts. Several principles apply here, but very differently with different persons. One principle is called the principle of "summation." That is to say, by repeating pleasurable sensations of a low degree of intensity at the right regular intervals, a large amount of massive pleasure may be secured. By "summing up" slight pains, frequently repeated, almost unbearable anguish may be produced. On the other hand, some feelings which are very pleasant or painful are much dulled by constant repetition. Pleasurable feelings may thus become less pleasurable; and some forms of action that have been very pleasant may even become painful.

The effect of repetition upon the feelings of different persons is very different. Some enjoy the familiar, others demand the novel. Changes of scenery, of surroundings, and of habits of life, which give some travellers the keenest pleasure, make others quite miserable. Thus, too, some are always moving, or "trading off" their furniture; while others would miss a single piece from its accustomed place only with great and prolonged misery. With lovers of music the monotonous West Indian strains which Gottschalk used to play are more enjoyed than more varied themes. These and the foregoing

facts are due to two laws of the nervous system: (1) severe pain exhausts the nerve-centres and renders them less capable of strong reactions; (2) the nervous system "adjusts" itself, within certain limits, to habitual forms of being excited, and the painful or pleasurable character of the reaction is determined in this way.

Diffusion of Feelings.—The conditions of all feeling, especially of the more intensely pleasurable or painful kind, so far as they are found within the brain, are such as necessarily to spread themselves over wider and wider areas. *Every state of highly painful or pleasurable feeling tends to involve all the areas of the brain, and thus to influence a large number of the outlying organs through the supreme control which the central organ has over the entire body.* Connected with this is the "association" of feelings with the varied activities of all the outlying organs. In this way certain sensations and movements become pleasurable or painful on account of the connections formed between them through the central activities. But this subject of "association," and of its effect upon the life of feeling, requires that we should consider the nature of our ideas and of the laws that bind them together, before it can be satisfactorily discussed.

CHAPTER V

MENTAL IMAGES AND IDEAS

It is evident that the different states of consciousness cannot be thought of as parts of *one* mental life unless they have something to serve as a kind of bond between them. We express this truth when we think of memory as binding our present experience to that of the past. For example, I remember that, at such a time and place, I saw such a sight, heard such sounds, or thought such thoughts and formed such plans. The sight, or sound, or thought and plan of the past is now recalled, or "brought back" to mind—as we say—by memory; its "image," or "idea," arises to "represent" it in the mind. This experience, and the language used in speaking of it, shows that the conscious binding of past and present together, which makes experience a unity of our own, depends partly upon the nature of mental images or ideas so-called. It will appear later on that this is true of all picturing by imagination, of the knowledge of things, and of the processes of reasoning. Hence the importance of the subject which is examined in the present chapter.

Nature of the Mental Image or Idea.—Something may be learned on this subject by considering carefully the words which are customarily employed.

The word "image" is more properly used only of experiences with the eye. The Latin word from which it comes might be applied to a mask, or a ghost, or a phantom. It therefore stood for something which is *like* something else, but which *is not* that which it is like. The image "represents" or "pictures" what it is not. Thus our mental images of the sights we saw a year ago are like, and so fitted to represent, the sights themselves; but they may be said to differ from the sights somewhat as ghosts and masks differ from real forms and faces. It would seem somewhat inappropriate to speak of the "images" of smells, of tastes, sounds, touches, etc. But such language would be perfectly true to the facts, and is very convenient in psychology. For it is assumed, in general, that much of what is now in our minds represents, or stands for, what has been in the same minds in the past.

After-Images.—Let one fix one's eyes for a half minute on the flame of a candle or lamp or on a brightly colored spot, and then close them and watch what occurs. The first thing noticed will be an *after-image* of the object, which is called "positive," because it has essentially the same color as the object itself. But soon this first image fades away, changes color, and the "negative" after-image, or image with the complementary color (see p. 41), takes its place. Since such after-images are clearly sensations, although produced only by the continuance of the excitement of the retina after the external light has been shut out, they are sometimes called

"after-sensations." But now, after these sensations have died away, many persons can bring up again in consciousness a fainter and less life-like copy of the original impression. This copy may be called the primary image or idea of "first intention," as it were.

What is true of experience with the eyes is in the main true of experience with the other senses. The sounds of the violin that has just ceased playing die away gradually in the ear. They are sometimes made to *seem* to continue by a trick on the part of the player, who appears to draw his bow over the strings after he has really ceased to do so. After-images of the sensations of temperature often cannot be distinguished from those sensations which we know to be produced by changes of heat and cold in things applied to the skin.

Fading of Mental Images.—In general, all impressions of sense tend to fade away and grow less vivid as time passes. Many of these images, if not caught and fastened at once, as it were, by an interested attention, are quickly gone, and perhaps never to return. For example, if you are absorbed in reading, and some one reaches over the table to take a pen, or the clock strikes, and then within two to ten seconds you are asked: "What has just happened?" you can answer correctly. But if a somewhat longer time passes between the event and the question, then you can give no answer. For the primary image has then faded away beyond recall.

The time which it ordinarily takes for such a

primary mental image to fade away has been investigated by experiment. One investigator found that the memory-image for weights sank very rapidly the first ten seconds, and at the end of that time was nearly gone; the same length of time has been thought to be most favorable for our memory of the pitch of tones. Another found that a particular shade of gray could be recognized only so long as the interval was not more than sixty seconds. Still another, who experimented by learning series of "nonsense syllables," discovered that after one hour the memory-image retained one-half its strength; after from eight to twenty-four hours it retained one-third its strength; after six days, one-quarter; after thirty days, one-fifth, etc. Sometimes, however, these memory-images retain all the vividness of sensations for days and weeks. Music-teachers often hear "ringing in their ears" for a long time, the sounds which their pupils make; many of us may use the same words to describe the memory of an air we heard at the concert of last night or of a week ago. The experience of those who use the microscope much is similar. One worker in this science tells how, when walking the streets in Paris, he could see the images of his preparations standing out on surrounding objects.

Sensations and Mental Images.—We have seen that sensations sometimes fade away into mental images, so that we cannot certainly distinguish between the two. The same truth as to their relation is gained by taking the opposite point of view. That is,

memory-images and what is called "work of the imagination" may become so vivid as to be indistinguishable from sensations. Thus many persons have only to close their eyes and try to *picture* things they have seen, and soon the pictures have almost or quite all the strength of reality. Some musicians, like Beethoven (even after he was deaf) and Mozart, hear the melodies and harmonies they compose "ringing through their brains," as it were. Some painters can summon those whose portraits they are painting so vividly before them as to paint from the memory-image as though from the form of the person himself. The religious devotee, Benvenuto Cellini, in answer to prayer, used to see the disk of the sun in his prison under ground.

Different persons differ very greatly, however, in their power to recall or to imagine with vividness the impressions already had of objects of sense. And some who have much power in imaging objects of one sense have little or none in still other directions. Thus some are good "visualizers"—as it is said; that is, they can vividly recall or picture impressions which have been received through the eye. But others, who are deficient in this particular power, can mentally represent with great intensity and life-likeness the impressions received through the ear, or the skin, and the muscles. Some also recall smells and tastes much better than most men can; although, if one might speak of "images" of smells and tastes, they are ordinarily much less life-like than is the case with the images of the other sensations.

The reasons and the effects of this difference will appear later on.

Conditions of Mental Images.—There can be no doubt that certain properties of the brain-substance furnish the physical conditions of the memory-images and the images of fancy. Somewhat similar properties belong to all organized matter, and, indeed, to matter that is not—strictly speaking—organic. The photographer prepares a plate which stores up and retains for months the indescribably delicate changes that occur in the chemical film spread over its surface, during an instant of exposure to the sun's rays. A good old violin may be said to have a sort of "inorganic memory" stored up in its woody fibre. The tissues of the body generally retain the effects of the conditions to which they have been subject; and these effects they show in their habits of nutrition and growth. But the cells of the brain are by far the most sensitive substances in this way. It has been said that they are never the same after they have been subjected to any form of modifying influence; they always afterward bear in themselves the "traces" of this influence.

It would be an entirely false interpretation of what has just been said, however, to suppose that there are impressions literally made in the substance of the brain which are "copies" in any way of the impressions of sense; or that "traces" of sights and sounds literally exist in its fibres and cells. All we know is that the different elements in this substance —and probably also the different molecules in each

element—become accustomed to act together in certain ways which are similar to those in which they have acted before. This is to be considered as, in part, a tendency to react in a similar way whenever they are again similarly excited. And this tendency, with all that it implies, is somehow mysteriously passed over from one stage to another in the growth and life of the brain. This is sometimes called the principle of "dynamical association" as applied to the substance of the brain.

Images and Ideas.—If the sensuous vividness of the mental image is very low we may call the act and the object of our mental representation an "idea." This word has been used with a great many meanings; it has also been much abused. In spite of this, however, it seems necessary to employ it in the meaning which we are about to give it. To realize what this meaning is, let us call up as well as we can any experience of some time ago; it may be a very vivid flash of lightning or a loud crash of thunder; it may be the face of an absent friend or of some scene in nature; or it may be certain thoughts and feelings which passed through our mind at a distant time. Now—to turn back to what was said at the beginning of the chapter—this which is now before the mind is somehow *like* our first experience, and yet it *is not* that original experience. The fact may be expressed by saying it *represents* the experience, or it stands in the relation to it of a "copy" to its "original." Now, then, we shall understand better what is the nature of the idea if we examine briefly what is the nature

of the relation it sustains, as a so-called copy, to its so-called original. This relation may be examined under three heads: (1) intensity; (2) life-likeness; and (3) certain accompaniments of that whole state of consciousness of which ideas form a part.

Intensity of Ideas.—It has sometimes been said that ideas have really no intensity, since the idea of a cannon's roar is no louder than the idea of a whisper; nor is the idea of the sun brighter than the idea of a candle. But this is to confuse what we are now calling "ideas" with thoughts. I can *think about* "thunder," or about "the sun," without any more intense or vivid mental image of sound or of sight than I have when I think about "a whisper" or about "the candle." Probably, also, I rarely or never have any copies of my more strong impressions of sense which are equal in strength to their originals; though few persons, if any, are unable to bring up at will a concrete mental picture of some sense-impressions which have a high degree of vividness. That shriek, for example, which you heard so long ago; how it sounds still in your ears whenever you think about it! That face of the loved one who is now dead; how it stands out at times before the mind's eye! And then there is "the touch of the vanished hand."

In spite of the objections of some psychologists, we know that certain of our mental images are less vivid than the sensuous impressions which they represent, and yet that they are always more or less vivid, and sometimes startlingly and painfully so.

Ideas may then properly (however figuratively) *be called "fainter copies" of their originals.*

Life-likeness of Ideas.—The mental pictures which memory or imagination produces are not only more or less like their originals in intensity, but they are also more or less like them in respect to the completeness with which they represent those originals. They are more or less full of life, or "life-like." For example, let one try to recall a landscape or the face of an absent friend; one is likely to have to proceed with the effort in a sort of piecemeal way. The result at any one point in the entire process is not only pale, but thin and sketchy, as it were. How the face of the original landscape or person stood out in completeness of detail! But what we recall is like those traces or outlines which, when drawn upon a blackboard, only serve to suggest how we should go to work by continuous activity of imagination if we wish to fill in more nearly the entire details of the picture. Still our perceptions of things by the senses differ in somewhat the same way. Sometimes, for example, we are utterly astonished all at once to discover a great wealth of particulars in some object—like the carved back of a chair, or a picture—which we have seen a hundred times before. But, in general, *ideas are much less rich in content, less full in life* (or more "schematic," to use a professional term) *than their originals are.*

Accompaniments of Ideas.—The whole state of consciousness, when one is remembering or imagining,

is quite different from that when one is observing some object of sense or attending directly to what is passing in one's own mind. The more "spiritual" of these differences will be noticed later on; it is by them largely that we know whether we are imagining and remembering or are "really" observing some object of sense. And it is partly on account of the removal of these differences that the images of dream-life seem real, although they are so fantastic and impossible to realize in actual waking life.

At present it is enough to notice that *the feelings, thoughts, and movements which accompany our ideas differ from those which are connected with their originals.* For example, in order to see a landscape as an impression of sense, I must keep moving my eyes and perhaps my head; but this is not necessary in the same way when I remember it. Then, too, the tone of feeling which goes with impressions of sense when they are originally received differs from that with which they are recalled or imagined.

And this brings us to another important consideration. Ideas, like sensations, never occur alone or separated in the "stream of consciousness" from other forms of mental life. Moreover, they do occur in connections of various kinds with one another. This only amounts to saying that, when we remember or imagine anything, what and how we remember or imagine depends upon what our experience in the past has been. This general truth leads to the following considerations about ideas:

Fusion of Ideas.—By such a phrase as this we must not be led to suppose that ideas are real existences which get joined together, or "fused," as it were, within the mind. *But the mental images of many impressions of sense which were originally separate, and which perhaps came through different senses, appear, as remembered or imagined, in the form of inseparable parts of one mental state.* Or if they are not absolutely inseparable, they show a strong tendency to follow each other immediately, so as together to color the whole character of consciousness. Thus we read of one learned man, who, having committed a book to memory when running errands as a poor boy, could never afterward recall the contents of that particular book without seeing the flitting images of the hedges and palisades by which he ran when committing it. Another, who had worked as apprentice for a hatter, could never see black wainscoting, like that of the room in which he had worked, without its being "fused" with the image of the smell of varnish. It assists us all to imagine how, for example, a violet smells, if we call up the mental picture of how a violet looks; and it is even difficult to imagine the dentist's file, or the surgeon's probe, without feeling anew the disagreeable sensations they actually occasion.

The fact is that all our states of memory and imagination are very complex; and the way that the numerous ideas which enter into them are related together is also very complex. With different per-

sons, and with all persons on different occasions, one idea or another may take the lead, as it were; and the other ideas which accompany this one may play a more or less prominent part in the whole mental state. We all illustrate this experience when we confess how much easier it is for us to recall some ideas rather than others. For example, let a group of persons who have just dined together at table give a mental picture of what the total thing is remembered by them as being; and with one it will be more a matter of sight; with another more a matter of smells, or of tastes, or even of sounds. It may perhaps be said, then, that *every complex idea is the result of a number of tendencies to reproduce past experience which are solidified for the time being under the limited and unifying activity of that particular movement of the mind's life.*

Spontaneous Recurrence of Ideas. — Some ideas, especially those which have been very recently and vividly impressed upon us seem to keep up a constant striving to get into consciousness and to take possession of its field. Of course, this is really only a figurative way of looking at the matter; but all have plenty of experiences with which to illustrate what is meant. The boy in school can scarcely keep down the memory of his last half-holiday or the idea of what he will do to employ the next. The anxious ideas of the business or professional man keep pressing to the front. When one is separated from some person whom one loves, one keeps on finding the image present in the mind, without

knowing how it gets there, or even in spite of all effort to keep it out. It is this experience which has led some students of the mind to speak as though the ideas themselves existed underneath consciousness, with a sort of "tension," or "strain," or pressure, to rise up into the conscious life. It is better to say, however, that such experience is due to the tendency of the mind, in connection with habit and interest, to act repeatedly in the same way. That is, the spontaneous recurrence of ideas is due to the mind's tendency, somehow acquired, to go on "ideating" as it has done in the past.

Series of Ideas.—Many of our impressions of sense, and also our experiences of other kinds, occur in regularly established series. This may be due to the very nature of things and of our faculties in getting a knowledge of them; or it may be due to comparatively artificial and changeable causes. For example, the order in which we remember a number of stars that we have ourselves traced out in a constellation, or the different mountains in a chain, or the objects along a road we have travelled, is fixed for us. So for the individual is the order in which he learns the letters of his alphabet, or the successive notes in a tune which he is taught to sing. But many series depend upon chance for the order they assume; or upon some practical end to be served by running them through; or even upon choice as at first exercised in putting them together in a certain way.

But however any series may have originated, as

first committed to memory, it tends strongly to recur in the order in which it first became the possession of the mind. This order it may become very difficult to change. Thus it is much easier for most persons to say the alphabet forward than backward, although there is no natural cause which determines why the order should be precisely as it is. And probably no one, on a first trial, could sing "Old Hundred" backward, no matter how many times he had sung it in the regular way.

Two important truths are known, however, about the effect of learning ideas in series. First: if we have once learned a series, "skipping" is possible with some considerable saving of mental strength, as compared with an absolutely new process of learning. To learn a series without "skipping" makes "skipping" in that same series easier. Thus the experiments with nonsense syllables (comp. p. 71) showed that, on skipping one syllable in any series, the saving from having once learned and then forgotten the same series was still some ten per cent. Second: the different members of any series thus learned together do, to some extent, suggest each other in the reverse order from that in which they were originally learned. It is easier to learn a series backward, if it has once been learned forward. All this illustrates some of the simplest forms of the principle of "association of ideas."

A sort of "condensation" of such series of ideas takes place when they are very frequently repeated in the same order. The mind rushes forward, as it

were, to the end; the more impressive and important members come to stand for the whole, and the less impressive or important become relatively faint or drop out altogether. It is like the case of from *A* at once to *X*, *Y*, *Z*, for the whole alphabet. If, for example, we try to picture an entire voyage from New York to Liverpool, or from San Francisco to Yokohoma, the whole is likely to consist of a brief series of pictures with the more vivid and detailed ones at the end and a few fainter and less life-like ones thrown in between. It is only this process of condensation which makes it possible for us mentally to represent our past with any fulness at all.

"Freeing" of Ideas.—It was seen some time ago (p. 76) that the ideas are more sketchy and in outline, as it were (more "schematic"), than the original experiences which they represent. It is this which, in part, makes it possible to represent those experiences at all. For the living reality of the world of the senses, and of our own consciously known mental life, must be recalled and imagined under comparatively few forms. So, then, a process goes on which has been called that of "freeing" the ideas. That is, many mental pictures lose the definiteness of connection which belonged to them at first. Thus they stand for more things, but for no one thing with anything like so much detail. What this means may be made clear if one will notice what goes on in the mind when one tries, for example, to form the definite mental picture of *a* dog, *a* rose, or *a* man. But here the so-called "idea" comes very close to a "*thought*

about;" and, indeed, it requires some consideration of the question, what it is to *think*, before we can pursue the subject further in this direction.

Association of Ideas.—Not only are the simpler ideas "fused" but—as we frequently say (see p. 78f.)—they become so related that they "suggest" one another. Thus one idea makes us think of another; or one idea "brings another to the mind." In not a few cases, in spite of all that psychologists have said, no known laws rule the succession of our ideas. They seem to be thrown up without reason from the dark background of the soul's being, into the light of consciousness. They come, we know not whence or why, and go, we know not why or whither. Thus, often in dreams, how fantastic and disconnected the mental images certainly appear! Nor does the most careful scrutiny of them always enable us to detect any relations between them, any reason why they should follow each other in the order which they actually take.

On the contrary, traces of suggestion not infrequently—and perhaps generally—do appear when we inspect carefully the current of our ideas. For example, some persons, on shutting their eyes, have a series of visual images unfold themselves before them, in a very concrete and vivid way, to which they seem to remain passive spectators, as it were. To take a single instance: a bow—an arrow—hands drawing a bow—a cloud of arrows—falling stars—flakes of snow—ground covered with snow. Here a certain connection between the different images is

perfectly apparent. *In general, the reason why one idea rather than others exists in consciousness at any particular time is to be found in the fact that such an other idea rather than some one still different preceded it.*

Laws of Association.—The question of course arises at once whether any *laws* can be discovered under which to bring this fact that ideas suggest each other. The very word "suggest" indicates that here is a principle far broader than any of the particular laws which have been proposed for the association of ideas. *All mental life falls under the principle of suggestion.* For not only do ideas suggest each other, but actual sights and sounds and tastes and smells suggest ideas. For instance, the smell of some perfume suggests the lady to whose dress the faint odor of it clung when we met her years ago; or the sight of suffering suggests the idea of a remedy, and we run at once to help the sufferer. Besides, we must not think of ideas as proceeding in this work of suggesting each other like a piece of machinery that runs on by itself, as it were. For within certain limits we can make use of this principle of suggestion to control the ideas; *we* can suggest to the ideas that they shall confine themselves within certain limits, and so carry out some plan we have more or less deliberately formed.

Various attempts have been made to reduce to the smallest possible number all the so-called laws of association. Thus it has been noticed that means suggest their ends, causes their effects, signs the things they signify, and the reverse. The wood

lying by the fireplace suggests building a fire, and the idea of a fire—itself suggested by the sensations of coolness—suggests the wood to be used. The smell of the smoke suggests the fire as its cause; and when one sees a boy bringing a lighted match near a saucer of gunpowder, the probable effect is immediately brought up in mind. Any word or gesture suggests certain things or mental states of which it is the sign; and the thing or feeling suggests its own name when once one has become acquainted with the latter.

Principle of Contiguity.—In the attempt to reduce the number of the laws of association to as few as possible, there are two which have been most generally adopted. These are the law of "association by similarity" and the law of "association by contiguity in time and place." By the former it is meant that ideas tend to suggest what is *like* or *similar* to themselves. Thus the idea of this man with the Roman nose suggests the idea of another man with the same kind of a nose; or the mental picture of this cathedral suggests another cathedral which has been seen or read about in the past. By the latter law it is meant that the parts of any complex experiences which have been had together at any particular *place* or *time* tend to suggest each other. Thus the idea of one object in a landscape we have formerly seen suggests the other objects in the same *landscape;* or any part of an event suggests the other parts of the same complex event. Sometimes a principle designed to cover the whole ground is proposed and called the

"law of redintegration." This means that, because the mind works under the principle of habit, the tendency always is to reproduce the whole of any past experience. The principle and the tendency are true without doubt, but they do not state in the best manner the one great law of the association of ideas.

This one great law we believe to be found in the "principle of contiguity;" only it must be remembered that ideas are not real existences, but only processes of the mind, and that the "contiguity" here spoken of is figurative, and implies the being parts of one complex mental process taking place in time. *Similar ideas, as such, have no particular tendency to suggest each other.* But—as will be seen more clearly later on—whenever we are gaining a knowledge of anything we notice similar points and bind them together, as it were, in the unity of consciousness. Thus similar ideas do come to form links of connection in an indefinite number of directions; and in remembering past experiences we are constantly passing from one item of past knowledge to others that have similar characters. But the explanation of the so-called power of similar ideas to suggest each other, as well as of dissimilar ideas to suggest each other ("law of contrast"), or of means to suggest ends, etc., is one and the same. In this meaning of the words, then: *Only ideas that have once been contiguous in consciousness (that is, parts of the same unifying process of the mind) tend to suggest each other.*

Special Laws of Association.—Under the general principle which has just been explained, every person's particular trains of ideas are all "associated" together. But *what are the particular associations* for each person at any one time will depend upon a number of considerations. Among them the following are important: (1) What are called the "natural tendencies" of every individual are very powerful. Some have original *aptness* in certain directions, and so *ease* and *interest* in performing certain mental acts rather than others. (2) Closely connected with this is the influence of temperament, age, and sex. The memory and imagination of youth and of old age are different; in general the same things suggest something different to women and to men. (3) So the mood, and the passing or more permanent condition of body, has a great influence. We are apt to think of *gay* things when *we* are gay, and of *sober* things when *we* are sober. (4) The intensity and vividness of the original impressions, and the way they happen to fit in with the mental life at the time they occur, are also very effective in determining the association of ideas. In this way things very trivial in themselves get to be a part of the necessary connections of the mental life (see p. 78). (5) Repetition and habit are of the very highest importance. Everybody knows that ideas which are brought together over and over again tend to suggest each other. If this were not so we could scarcely learn anything or form any fixed habits among our ideas. But (6) our own feelings, desires,

and will have also a great influence. For, as will appear soon, *we*, to a large extent, determine for practical ends what trains of associated ideas shall run, and the point to which all the trains shall be for the time directed.

CHAPTER VI

SMELL, TASTE, AND TOUCH

THERE is a wide difference between merely having sensations and knowing the sensible qualities of things. For ideas and thoughts, as well as sensations, are necessary to any knowledge of things; and the same truth holds with respect to the knowledge of ourselves and of other men. The common use of language illustrates this. For example, when speaking of what things are, as known by the senses, we frequently refer to our "idea" of them, or even to our "thought" about them. And when looking at a new and strange object in company, people are heard asking of each other, "Have you any *idea* what this is?" or "What do you *think* that strange object can be?" Such language recognizes the fact that one has to use one's memory and imagination, and to do some thinking, too, if one is going even to perceive things. It might almost be said that perceiving things is "minding" things; for are not careless and inattentive observers exhorted to "mind" as they look, or listen, or feel, or taste, if they would really know what the qualities of things are?

Nature of Perception.—The word "perception" is very generally used in these days for that knowledge of things which seems to come at once through the

use of the senses. Thus one has only to open one's eyes and the whole landscape, or the entire side of the room with its pattern of wall-paper and its pictures, instantaneously appears "stamped" or "impressed" upon the mind. In hearing a piece of music, where it is necessary to listen somewhat attentively, we seem to ourselves even more passive. But when with shut eyes we are feeling our way about a room, or are tracing the outlines of a complex object (a geometrical solid or a piece of carving), the fact that *we* are active in perception becomes more apparent. So, too, when the attention is arrested by something unfamiliar in the food we are eating, we often change quite abruptly from simply *letting ourselves be impressed* with certain sensations of taste to an *active* tasting which is to result in telling us, by comparison with some recalled image, what the thing we are tasting is.

Both observation and experiment prove that the distinctions just made are only matters of degree. We are active, attentive, are having ideas, and using thought—to a greater or less extent—in all our perceptions. The formation of all perceptions, moreover, consumes more or less of time. This is a matter which can be tested by experiment; and it is actually found that the number of thousandths of a second which it takes to perceive any object, or group of objects, depends on their complexity and on the activity of the mind in recalling ideas and in thinking out the meaning of sensations. Besides, consciousness actually shows how, while studying attentively

the same object for several seconds, the knowledge of it actually grows, in dependence on the degree and manner of minding it, as it were.

It appears, then, that *all the elementary processes of conscious mental life are concerned in Perception by the senses; but the other processes are to be regarded as excited, directed, and determined, with respect to the entire state of consciousness, chiefly by those peculiar modifications of consciousness which have been called sensations* (see p. 32f.).

Development of Perception.—It follows, from what has just been said, that all perceptions by the senses are matters of growth. Babies just born perceive nothing; to them there are no "things," because they have not yet learned how to perceive or "mind" them. In adult life also the perceptions of different persons are very different. One man's eye or hand instantly perceives what another's cannot perceive at all, or can perceive only after the slowest and most laborious effort. On this general truth all students of psychology are agreed. Nothing that the modern study of the science has done is more important than the emphasis and clearing up of this truth. More and more science has traced in detail how it is, and under what conditions, that perception by the senses develops. But no investigation has made perfectly clear—and perhaps it will never be known—just how much, and what, of this many-sided activity of the mind must be called "natural" or "native;" and just how much, and what, must be assigned to development. More would be known

about the whole subject if we could penetrate the mysteries of the baby's consciousness, and so discover precisely what the character of his sensuous experience is. Do his sensations of light and color, his feelings of pressure and motion, seem to him to be "out" of his consciousness; have these sensations any quality of being "spread out" or extended, at all as ours are? Have his first sensations of heat and cold, his first sensations connected with the play of the muscles which move the limbs, any "locality" whatever? Have they any quality other than that which has already been spoken of as belonging to "local signs" (p. 50), that would make it possible to locate them as not "in consciousness?" Is the distinction between "the inner" and "the outer" possible to the infant's mind at all?

These are all questions to which only a doubtful answer can be given. And so brief and elementary a treatise of the subject as this can scarcely be expected to do more than call attention to them.

Classes of Perceptions.—Some kinds of perceptions do most obviously reveal at once the qualities of things as others do not. This distinction between different perceptions all language and all experience makes plain. And here, on the one side, stand the smells, tastes, and sounds of things; while, on the other side, stand sight and touch—if in the latter be included all the knowledge which comes also through the use of the muscles and joints. For by smell, taste, and hearing (as distinct from the perceptions of touch which accompany and fuse with

them) no direct knowledge of the qualities of things is gained. We smell, and assign the odor to such an object located in such a spot, because we have before experienced the same sensations in connection with the seen or felt presence of the object; and because we can know, or guess its direction by certain changeable signs. So, also, if the flavor of the object be considered wholly apart from its "feel" in the mouth as it is being tasted, *we* are affected; but through this affection only an indirect knowledge is obtained of the existence and qualities of any thing.

On the contrary, what we see and touch *is* the thing, as known to the mind by the senses, actually there present and spread out in extension before us, as it were. This is true of its color and hardness or softness, its roughness or smoothness, and all its solidity and weight, etc. Thus any particular thing might be described as *being* what it appears to sight and touch to be; and then there might be added what also *we know* about the odors and sounds it can "give forth," or the "way" it tastes when taken into the mouth. Hence sight and touch are sometimes called the "geometrical senses;" because they give, as actually present in the thing, its qualities of a spatial kind. But smell, taste, and hearing are called "non-geometrical;" because they do not directly afford any knowledge of the spatial qualities of things.

The different principal forms of perception by the senses may now be considered in particular; and what has been said as to the nature and growth of all

perception, and as to the relation of these two classes of sensations, should be kept constantly in mind. For purposes of convenience, however, the different perceptions will not be treated in the precise order which is suggested by these two classes.

Perceptions of Smell.—Perceptions of smell afford no direct knowledge of the qualities of things as external and spread out in space. If two different smells operate upon the organs at the same time, the stronger of the two drowns out the weaker. Two smells cannot, so to speak, be made to lie "side by side" in space. We know even that the nose is the organ of smell only indirectly through the sensations caused by the muscles in sniffing in the air and by the passage of the air over the skin of the nostrils. The direction of the object which occasions any smell is also known only indirectly, by the amount and quality of the sensations, as the head is turned toward or away from it, or as the body moves in the direction where it is situated.

There is a kind of knowledge which comes from smell that admits of a high degree of cultivation. But it is the lower animals and the lower races of men which usually possess this perception in its most acute form. The negroes of the Antilles are said to distinguish by smell the footsteps of a negro from those of a Frenchman; so also the Indians of Peru, the race to which an approaching stranger belongs. Some subjects, when in the hypnotic state, can assign the articles belonging to an entire roomfull of persons by the peculiar odor of each. It is said that

Caspar Hauser could tell the leaves of different trees by smell.

" **Perceptions of Taste.**—As regards the knowledge gained of the qualities of bodies, perceptions of taste resemble those of smell. But in tasting any substance, it is actively rolled about in the mouth; thus the substance is also known by the skin and muscles, as located "in the mouth," and as hard or soft, fluid or solid, and also, to some extent, as having such a size and shape, or as so many in number.

The more highly civilized peoples are more discriminating in tastes: the very reverse of the ordinary rule for perceptions of smell. They use perfumes mostly for mere pleasure, and not to give them any knowledge of things; but the case is not the same with the delicacy and acuteness of tastes. Tea-tasters and wine-merchants, for example, become exceedingly accurate judges of the "crop" or the "vintage;" and it is said that certain Roman epicures professed to know by taste where the fish was caught, and on which leg a partridge had slept just before being killed. Men in general are becoming more and more "particular" in their tastes.

Perceptions of Touch.—Under this head may be included all the knowledge of things that comes immediately through the skin, muscles, and joints. Through these organs at least four classes of sensations are derived (comp. p. 41f.). But if the division is made according to the two principal classes of bodies whose qualities and relations to each other

are known in this way, it may be said: by touch one has the perception of one's own body, of its different areas and their conditions, and also of the various other bodies which in any way come into contact with it. These two kinds of knowledge (the knowledge of *our own* body and the knowledge of *other* bodies) proceed, to a large extent, as it were, side by side. That is, the child does not first attain a complete knowledge of its own body and then make use of this knowledge to acquire the knowledge of those qualities of other bodies which come by touch; nor does it first know all the qualities of other things by touch, and then apply this knowledge to the task of learning to know its own body. But little by little, what is at first all confusion, as it were, clears up; and so the different members of the body become mentally separated from each other and from the things known in contact with them. How this process comes about we shall now try briefly to explain.

Earliest Knowledge of the Body by Touch.—It is probably crude perceptions of the arms and legs, and perhaps of the abdomen, back, and face (especially around the mouth), which constitute for the infant its first knowledge of its own body. These are the parts that are either most in motion, or else are oftenest pressed upon somewhat heavily or are subjected to changes of temperature. The following experiment is instructive, as showing how very broken and "scrappy," as it were, is even the more mature knowledge of our own bodies, *solely* by touch. Let one shut one's eyes and try to divert attention

from all images of the bodily members that have come by sight; and now what is one's body to one's own self? As we let attention wander over the field, so to speak, we *feel* one limb after the other; but this only obscurely, unless some part of the limb is being rather sharply pressed by the chair, or by some other portions of our own body. If now one wants more definitely to perceive any part of one's own body in terms of touch, one has to move it so as to bring out the sensations of the muscles; or to press it against something, so as to intensify the sensations of the skin. *It is not possible all at once, and as a whole, to perceive one's own body by touch.* For one born blind the body always consists only of a system of members, thus interrupted rather than continuous, and that must be felt successively rather than seen simultaneously. And even persons not blind, who have lost a leg, for example, sometimes feel the foot which belonged to that leg as though it stuck out immediately from the stump.

It is possible to explain how these perceptions of the body by touch are acquired. It must be remembered, however, that the infant's first movements of its limbs are random and impulsive; or else they are reflex—that is, are due to the effect of some kind of irritation upon the external parts of the body (see p. 50f.). They imply neither any perception of themselves nor of some end to be gained by the movement. They are more of the nature of a living machine that runs partly as stirred up by springs inside itself, and, partly, by forces acting upon it

from without. We might even say that these movements are *for* consciousness instead of being *by* consciousness. We shall now consider, further, the two classes of important perceptions which enter into the earliest knowledge of our own bodies by touch.

Perceptions of Motion by Touch.—The movement of any of the limbs occasions a series of complex and blended sensations, which come both from the skin and also from the muscles and joints. The character of this series depends upon the particular limb which is being moved and upon the direction, intensity, and distance of its movement. It can easily be seen that this must be so, if it be considered that the skin is differently stretched over the muscles and joints of each limb, and that it has different degrees of sensitiveness for its different areas; that the masses of the different muscles and the range and intensity of their movement are different; and that the sensations due to pressure at the joints vary as the character of the joints and as the amount and direction of the pressure vary. We can even experience the fact that this is so by moving any of our larger limbs and meanwhile carefully watching the changes which take place in the complex quality of all these different classes of sensations.

For example, if the arm be given a strong, wide swing in any direction, the result is to call out a certain series of complex sensations, which stand in consciousness for *that particular movement* of the arm, so far as it is known by touch. If the strength, or range, or direction of the swing of the arm be changed, then

the series of resulting complex sensations changes. All this, when referred to the arm as known by sight, *is* the perception of the arm as variously in movement and known to touch. That is to say, my arm, which I know as a whole chiefly from having seen it, is now known by touch to be moving in such or such a direction, etc. And what is true of the arm when in movement is true of every other member of the body, and of the body as a whole. In the case of moving the body as a whole, however, a great many obscure indications which come from the internal organs contribute to the complex result.

Perceptions of Position on the Skin.—E. H. Weber called attention to the interesting fact that, by using a pair of compasses on the different parts of the skin, the distance apart which the two points must be placed in order to be actually felt as two is found to differ very greatly. For example, on the tip of the finger or the red part of the lip it may require only one-twenty-fifth to one-tenth of an inch, while on some parts of the back and of the upper arm or leg it may require between two and three inches. More recent experiments have shown that every area of every individual's skin may thus be "mapped out" with regard to its comparative sensitiveness to touch; and that every area differs from every other, both in the case of the same individual and in case we compare different individuals. If, again, a pair of compasses be run over the skin of any considerable area of the body, without actually changing the distance apart of the points, then they will seem to

spread apart or to come together, according to the relative sensitiveness of the areas that are crossed.

Let this fact now be considered in connection with what was seen (p. 41f.) to be true of the "pressure-spots" and "heat-spots" and "cold-spots" of the skin. It now appears that the surface of the body is capable of yielding an indefinite variety of impressions due to the complex result of exciting its different elements, either in succession or closely together. So that anything travelling over the skin marks out the different areas, as it were, in consciousness. Each area has its complex characteristics, which correspond to that particular area and to no other. And here, as in the case of the muscles, *each series of perceptions corresponds to movement over a series of areas related together by the conscious activity of the mind.*

Positions of the Movable Parts.—There are very obvious means at the command of the mind for distinguishing the relative positions of the different movable parts of the body. In understanding this subject, two important differences between our perceptions of the bodily members at rest and of the same members in motion must be kept in mind. (1) When a limb is at rest it may either be held in position by the muscles, or it may be supported in position by some other part of the body or by some external thing. But the complex character of the perceptions is very different in each of these three cases, as any one may see by giving careful attention to his own experience under each of the three cases. And, further (2), our perceptions of the mov-

able parts, when they are not in motion, are very much less clear and vivid. In order to make them more clear and vivid, one has to make a demand upon memory; and what one tries to remember is, usually, either how they look to sight or how they felt when they were in motion. Thus experience shows that, *so far as touch without sight is concerned, the perception of the position of the movable parts of our bodies is largely a system of associated ideas due to previous movements.*

Development of Perception by Touch.—All increase in the knowledge of one's own body by perceptions of skin, muscles, and joints, proceeds in the main from what is more coarse and confused to what is finer and more clear. It is in "blurred masses," as it were, that the infant first perceives parts of his own body; such as his own lips, mouth, and cheeks, by their being engaged in nursing and their being fondled, or his back and abdomen as pressed upon while being dressed or while lying on the bed or the floor; or his limbs as being grasped and kept almost constantly in motion. At first, then, an infant cannot feel a burn, or the prick from a pin, as definitely *in* any particular part of its body; or—as one writer has expressed it—it cannot "place its toe in the pain." It is through attention, excited by interest and leading to finer and finer discriminations, that it comes gradually to clear up the details of its own body.

All this development, however, is essentially aided by the use of the eye. And in the same ex-

periences the infant is also learning to know other things by touch as separable and different from its own body. The process of acquiring knowledge of other bodies by these perceptions must now be briefly considered.

Distinction of our Body and Other Bodies.—The process of "setting off" other bodies from our own body by touch is the result of mental activity; it is a development. Two very important distinctions, however, make such a process possible: (1) Some perceptions of this class are very strongly colored with feelings of pleasure or pain, while others are almost wholly without any tone of feeling. Again (2), some perceptions are also dependent upon our own willing, wishing, and striving, as others are not.

At first the infant undoubtedly perceives other bodies only in the same vague and incomplete way in which it perceives its own body. But even then the two kinds of marked differences just spoken of are prominent. For example, when the mother or nurse grasps the child and puts it into the bath, or when the bands about its body are tightened or removed, or when a fly lights upon its skin and then goes away of itself, its experiences are very different from those which have just been described as giving it a perception of its own body. *What is perceived as some other body than its own is connected with its pleasures and pains in a way that it cannot control.* When it strikes itself with its own fists, or kicks itself with its own legs, it gets a sort of double lesson in making the same distinction. Part of its own

body thus becomes another body to itself for the time being.

The same kind of a distinction is much more finely drawn every time we trace out any part of our own bodies with the hand—"feel of ourselves," as we say; and then, again, when we use the same hand to trace out the outlines of some external body. In the first case, one series of perceptions represents ourselves as "touching" something, and the other represents ourselves as "being touched." In the second case, one series represents ourselves as "touching," and the other represents a thing that is "not ourselves" as being touched. The best way to bring out all these distinctions in consciousness is to experiment and notice carefully how *we feel* meanwhile.

Qualities of Bodies by Touch.—It is chiefly through the skin that the superficial qualities of bodies are known to touch. The series of impressions made on this organ is very different, whether the thing being explored is "smooth" or "rough," "hard" or "soft," "dry" or "moist," "cool" or "warm," "sticky" or not, etc. In perceptions of hardness and softness of texture the muscles, whenever the pressure is slightly increased, come into play. The dry and the moist are apt to combine sensations both of pressure and of temperature.

It is obviously due to the use of the muscles in pulling and pushing, in straining or actually lifting, that bodies are known as "solid" and "real" to touch. *The perception of solidity cannot be gained without the experience of movements, as actual and*

resisted, by means of the solid masses of our own body.

All knowledge of the size, weight, etc., of bodies is comparative, and depends upon a variety of perceptions which they occasion. Here the way the particular body meets the expectation of the mind has no little influence. Bodies that move more easily than was expected, appear lighter than they are; bodies that move only after giving us more than the expected resistance, appear heavier than they are. The rate of movement also is of influence. If a body is raised quickly, it is perceived to be lighter than when it is raised slowly. The principle of contrast also comes in to disturb our perceptions. If one stands for a long time with heavy weights in both hands, and then lays them down, one seems to be drawing one's arms up toward the breast or even one's self to be rising from the ground.

Perception of Distant Bodies by Touch.—All bodies which are not in contact with our own are known in terms of touch only as their appearance excites the images of past perceptions which have come while touching similar bodies. When, however, we are measuring with the eye the distance to which a stone or ball must be thrown, or the height of a wall or fence we wish to leap, or the probable weight of a body we design soon to lift, our state of consciousness is strongly colored with the images of past perceptions of the order of skin, muscles, and joint, as well as with sensations arising from the condition of expectant use into which these organs are put.

We thus reach one of the many cases where perceptions of the eye and those of touch penétrate each other, as it were, and greatly assist each other. In this assistance sometimes the eye and sometimes the organs of touch take the lead, in suggesting the appropriate mental images. But this consideration will come before us again after the perceptions of sight have been separately considered.

CHAPTER VII

HEARING AND SIGHT

HEARING differs from both touch and sight—between which we have placed it—in that it does not afford any direct perception either of the parts of our own bodies or of the qualities of external things.

Perceptions of Hearing.—Our own bodies as well as bodies outside of them are known by the ear only in an indirect way. Certain terms used with regard to the sounds perceived do indeed imply that they are themselves more or less extended. Thus men speak of "acute" or "piercing" sounds, and of sounds more or less "voluminous" and "massive." But the case here does not seem to be different from the perception of "heavy" odors or of "sharp" tastes when vinegar or pepper is taken into the mouth. To use the latter example: the taste of pepper is chiefly the perception of being pricked at an indefinite number of points on the tongue, while at the same time a certain smell arises in the nostrils. So, when the sound is very "massive," as in the case where a door is slammed or a cannon fired near to the ear, one feels as though the side of the head were struck a blow or the whole jelly-mass of the body set vibrating. Any one who has had his back close to a board behind which a grand organ was playing knows how

the whole body, both inside and out, seems enveloped in sound.

Place of Sounds.—The direction in which, and the place from which, sounds are perceived are matters of judgment and guessing, that are sometimes made, however, with wonderful promptness and accuracy. Sometimes, on the contrary, the mistakes made in locating sounds are more than equally astonishing. Certain perceptions of sound are due to causes that lie within the body itself and near to the organ of hearing; these have already (p. 36) been referred to as "entotic" sounds. Thus one sometimes finds it difficult to tell whether the sounds one perceives are to be placed "in the ears," as due to a large dose of quinine, or are to be located in a cricket on the window-sill. In hearing a concert, too, one can allow one's self for the time being just to float in the sounds, or to hear them as arising in the very interior part of the soul, and so lose all thought of the real, external sources from which they come. But if one looks at the players, then one may perceive the sounds as coming from them.

Experiments have been made to determine what means the mind has for placing the direction of sounds and also the degree of accuracy with which they can be located for the different positions. One observer found in this way that the accuracy was very much greater just in front of the head than just behind (as 6° to 1°); and also directly opposite each ear, and directly above and below the middle of the head. As to direction, we ordinarily place a sound on

the side of us on which it is most intensely heard; and if both sides are equally intense, then in the middle place. When both ears are used and the head is moved freely about, the direction in which sounds are perceived seems to depend upon the changes caused in the different intensities of the sensations in the two ears. If a current from a telephone is made to pass through both ears, a tone may be perceived in the middle of one's head. On the whole, however, all the means which the mind has at its disposal for perceiving the place and direction of sounds are not yet understood.

Qualities of Bodies by Sound.—All perception of what bodies are, which comes through the ears, is indirect, and has to be interpreted into terms of touch and sight. Thus, one box is called "hollow" and another "full," one substance "solid," like painted marble, and another "light," like wood of the same color as the marble; because when we rap upon them the sounds perceived resemble those which experience has previously taught us proceed from bodies that have these qualities as known to sight or to touch. So, too, when we say that we "hear" this or that thing approaching or receding, or "hear" somebody uttering such a cry, or "hear" this event happening (like the popping of a cork, or the crackling of glass, or the exploding of gunpowder), we are really making a very complex appeal to our past experience with things as known by sight and touch.

The one principle applying to this class of per-

ceptions may be stated as follows: *It is by means of sensations of the muscles and skin* (including, of course, the internal parts of the ear—" semi-circular canals," etc.) *that we perceive the place and direction of sounds, in a space already constructed by the eye, muscles, and skin.*

Perceptions of Sight.—If the eyes are turned upon a landscape, a little world of objects, all having not only color, but also shape, size, and distance, and standing in various relations of space to each other, is at once made known to us. It has already been said (p. 91f.) that this work of perception is really not instantaneous; and also that the ability to perform the act of perception is the result of a development of various powers. But all the more difficult do these facts make the study of precisely how this wonderful result is brought about. This difficulty does not, however, make any less certain the general principle that *perception with the eyes, like every form of mental life, is a process in time, and requires mental activity and mental development.*

Means for Visual Perception.—The means (sometimes called " data ") which are at the command of the mind, so to speak, for perceiving by the eyes the qualities and relations of things, are very numerous. The science of psychology is not yet sure that it understands them all. Some of them are indispensable for any true visual perception whatever; and others of them may be regarded as only assisting in the easier and more correct perception of spatial qualities and spatial relations. Among

such means the following are probably the most elementary: (1) The sensations of light and color which vary in quality and intensity, and which depend, partly, upon the place of the retina where they are excited; (2) sensations of the skin and muscles due to movement of the eyes; (3) sensations due to what is called "accommodation" of the eye —that is, the adjustment of the lens for nearer or more remote distances: with these always go (4) associated images of past sensations of all these three kinds; and (5) accompanying feelings, and perhaps felt activities of will.

But the fact that we have *two* eyes, and make use of both in seeing single objects, and the fact that various "secondary signs" (to be spoken of later) enter into almost all our vision, complicates further the study of this subject. In order, therefore, to consider it by passing from what seems simpler to what is more difficult and complex, the whole matter may be taken up in the following way: (1) The conditions for forming a visual image on the single eye when at rest, and the effect upon this image of the eye's movement; (2) the effect of the action of the two eyes together; and (3) the effect of other experiences which are partly dependent upon the exercise of the mind previously in perceptions of other kinds.

If all this seems rather complicated as a matter of science, the wonderful speed, completeness, and delicacy with which the eye masters its work must be remembered. It is the world of things as we see them, which is so varied and full of interest and of

different objects, for perception. If the blind man's world of thought and of moral and religious feeling is essentially like ours, how vastly different and poorer is his world of perception!

Two Principles of Visual Perception.—In all that is to be said regarding the perception of things by the eye, two principles must constantly be kept in mind. *Perception by sight is, like every form of mental life, a true process in time, and requires mental activity.* But, further, *perception by sight is always an interpretation of signs*, that are very complex and whose meaning often admits of being understood in several different ways. Under this last principle, as we shall see, things "look" very differently, according to the point of view, the condition of the bodily organs, and even according to our feelings, desires, and attitudes of will toward them.

Formation of a Visual Image.—It has already been seen (p. 38f.) that the eye is, in important respects, like the instrument which the photographer uses to secure an "image" of the person whose picture he is taking, upon a plate rendered especially sensitive by chemical means. The details of how the physical image is formed upon the human eye will be left for books on physiology to tell. It would be a fatal mistake to all true understanding of the subject, however, to suppose that the mind, in visual perception, somehow reads off, as it were, this image upon the retina; or even that some image corresponding to the image on the retina is transmitted to the brain. The mind knows nothing about any image on the re-

tina; and there *is* no image in the brain which is in any respect a copy of the image on the retina. *It is the sensations, considered as modifications of our consciousness* (see p. 32f.), *with their different mixtures of quality and intensity*, which are produced by the changes in the brain, *that constitute the "stuff"*—so to speak—*of our visual perceptions.* These sensations are "fused" with one another, and with the memory images of past sensations, in an almost infinite variety of ways.

Plainly one can never, now that one has grown up in the use of the organ of vision, put one's self back into an infantile condition, and so experience anew how "things looked" to one then. For, so far as anything can be determined about the matter—properly speaking—things did not look at all to us then. The nearest we can get to a study of such visual perceptions as might be supposed to arise with the use of one eye at rest is to consider the "color-mass" which appears before us, when our eyes are closed in a darkened room. But it can easily be proved that even this color-mass involves the activity of both eyes and the influence of countless experiences with them both, when open and when in motion. For, if now we open one of our eyes, with it we can (but only if we move it) seem to look at the color-mass still remaining and belonging to the closed eye. But even while both eyes are closed, we cannot perceive clearly any particular portion of this color-mass without moving our eyes in the direction of that portion; and

we cannot lift the whole color-mass toward the ceiling, or depress it toward the floor, without bending the eyes and even the head in these same directions.

Effects of Moving the Eye.—What has just been said shows the influence of moving the eye, and even the head, upon all our visual perceptions. Indeed it may well be doubted—although it is difficult to prove an opinion—whether any perception by the eye would be possible without its movement. From the earliest infancy the eye, while open, is almost never for an instant completely at rest. It is moving almost ceaselessly, during life, in all the waking hours. The reasons for this are, in part, the following: It is only when it falls upon a small spot at the center of the retina that the image of any object is clear. Objects whose images fall outside of this spot are seen only in "indirect vision;" they are not clearly perceived. There is therefore a nearly irresistible tendency to get the image of any object, which we wish to perceive clearly, to fall upon this spot (that is, to "fixate" it); and in order to do this the eye must itself move. It is thus that the eyes of even very young children follow every object which "attracts" or "draws" them. This movement is accomplished, in every possible direction, by the pull of six muscles (or three pairs) that lie in the socket of the eye. The muscular sensations which result in this way have thus, from the very beginning of experience, been connected with all our use of the eye. It is found by actual experiment that

the eye is almost incredibly sensitive to its own movement.

Accommodation of the Eye.—It has already been said (p. 38) that the lens of the eye, unlike that which the photographer uses, has the power of altering itself so as to be fitted, as is required, for nearer or for more remote distances. This alteration of the lens is accomplished by a rather complicated nervous and muscular apparatus, whose nature is not as yet fully understood. The effect of these changes is to produce a certain feeling which indicates to the mind, as it were, the position and size of its visual objects. The value of this feeling is greatest for near objects; for objects that are twenty or more feet distant it amounts to little or nothing. We know by experiment that, when the muscles of accommodation are paralyzed, and so we have to make much more effort to accommodate for the same near distance, the object may appear nearer than it really is, and so diminished in size.

The Visual Object.—By a great and constantly increasing amount of evidence, into the details of which we cannot go, this conclusion is proved: *Every extended visual object is perceived, as it is perceived, in dependence, not only upon sensations of light and color which are due to excitement of the retina, but also upon sensations of motion and upon memory-images of past movements, which are fused with the sensations of light and color.*

The Field of Vision.—When the eyes are opened, a larger or smaller number of objects is seen, which

all at once appear to stand together in certain relations of space to each other; and each one, in itself considered, to have a certain size, shape, and distance from us. This experience, regarded as a whole, may be called the formation of the "field of vision." In this sense of the words, the field of vision is as varied as all that we see, at all the various times in our use of the organs of sight. It could be shown, however, that in perceiving the details of every such field, we are accustomed to run the eye over it, and thus to master these details. The effects of all this experience of motion in the construction of the different fields of vision in the past make themselves instantly felt in every new experience, even when this is gained with a more nearly or quite motionless eye. Thus we seem compelled to believe, with respect to the whole field of vision, what we have just said seems to be true of every visual object. *Every "field of vision," as well as every object in every field, depends for its perceived qualities and relations in space upon past experience of the muscular and other sensations belonging to movement of the eye.*

The truth of both these statements becomes clearer when we consider the use of both eyes.

Images of the Two Eyes.—Since there are two eyes, there are, of course, two retinal images formed for every single object—one for each eye. How, then, can the object be perceived as single? Now, this question really has no such meaning as it at first appears to have, just so soon as it is understood that the mind knows nothing directly of the retinal

images, whether they are one or two, right-side up or wrong-side up; or whatever their shape and position may be. The fact is that *two images* are helpful, if not necessary, in order that *one solid* and real *object* may be perceived. If, now, seeing with two eyes be called "binocular vision," and if seeing things solid and extended in the third dimension of space be called "stereoscopic vision," then binocular vision is naturally stereoscopic vision.

That there are two visual images, any one may show to one's self. Hold the finger up against the sky and look steadily at the sky beyond it, and two transparent images of a finger will be seen instead of one solid finger. Look at any not too large object, and press one eyeball gently aside with the finger; in this way you can "uncouple" the images of any object. Many persons accustomed to experiment with themselves readily acquire the power to see things either single and solid or double and shadowy, at will; they can also slip one set of images of an entire section of some small and regular pattern (as of carpet, or wall-paper, or wire-grating) by its proper "double;" and can then unite it, with the double of another section, into a solid object.

For, of course, the reverse of the process of "uncoupling" the two images is the uniting of them into one object. For this purpose most persons require some help in the shape of a stereoscope. With this instrument any one can study the startling effects of putting together two more or less unlike and flat images. Thus all kinds of solids can be formed;

one can be made to look into a funnel or to perceive its small end turned toward one; and by uniting a right-eyed image of some cube in outline which is white, with a left-eyed image of a similar cube in black, one can be made to gaze into the transparent depths of a crystal.

Movement of the Two Eyes.—In all natural use of both eyes, they move in certain relations to each other, so as to act as one organ and yet with a great variety of changes in the details of their relations. This movement is called "binocular movement;" and, under all ordinary circumstances, the two eyes either (1) move parallel, when they turn equally in the same direction; or (2) they converge, when they rotate on their axes in different directions. Thus they can move right or left together, up or down together; and they can converge either in a symmetrical or in a non-symmetrical way. These different movements result in the production of a great variety of sensations of motion, of strain, and of position; and in connection with the changes of accommodation which the lenses undergo, as the distance of the objects looked at varies, and with the coupling and uncoupling of the double images, they furnish that indescribable multitude of experiences on which the development of perception with the eyes depends.

In one word, then, *the field of vision in which solid objects appear as related to each other in space is due to an activity with both eyes, in which varying "local signs" of the retina* (see p. 50) *are combined with varia-*

tions in the muscular and other sensations due to the eyes being moved together.

Instantaneous Vision.—When the field of vision is seen as lighted by an electric flash (that is, too briefly for movement of the eyes to take place), or when it is seen with only one eye, whether in rest or in motion, the objects in it appear extended and solid and all in their proper relations in space. In such cases, however, it would seem that these perceptions are possible because of previous experience with both eyes in motion. Such instantaneous vision is ordinarily less perfect; it involves less mental relating and discriminating; it is more dependent upon memory-images, and more like that producible by flat surfaces skilfully colored. And, indeed, the means of "deception" and "illusion" which art employs in presenting its objects to the eye enter very largely into this, as they do into all vision.

Secondary Helps to Vision.—There are many considerations on which the mind relies in its perception of objects that are not so invariable as those already considered, but that are none the less, as a rule, present and effective in all ordinary vision. These are sometimes, on this account, called by the title "secondary helps." We now mention several of the most important. (1) The way the lines run which limit the object often determines how the object shall be seen. Lines that cover other lines must be seen nearer, of course. Hence, when we have a system of lines that admit of more than one interpretation, the object may be perceived in one or more different ways. (2) The

size of the angle covered by any object influences the distance at which the object shall be perceived. The nearer together the parallel rails of a track appear the more distant they appear. (3) Atmosphere and the size and direction of the shadows are also of influence. Travellers in Colorado know how near objects appear there, on account of the clearness of the atmosphere. Things seen through a fog are perceived very large, because, appearing dim, they are perceived distant; and then, since they cover a large angle of vision, they are seen both distant and large. (4) The surroundings have also much to do with the apparent size and distance of what is seen.

Influence of Suggestion on Sight.—It might almost be said that all vision is chiefly a matter of suggestion. This would be in some respects like saying that all developed sight is a matter of interpretation (see p. 111). Thus the eye often "catches at" a few meagre outlines or blurred color-masses, and uses them to suggest to the mind what it shall perceive. All are familiar with the attitude of expectation with which people watch one drawing a figure on a blackboard, to see *precisely what it is* that he is going to make us see. Is it a bird or a bat, a man or an ape, a maple or an elm, etc.? Just a stroke or two appears to decide the question and to make the perceived reality start out, as it were, in all its fulness before the mind's eye. On the other hand, hasty vision is often inaccurate vision, because the suggestion has "run away with us," as it were. In similar fashion persons in the hypnotic state are almost

sure to see anything which it is suggested to them to see.

Influence of Feeling on Sight.—What one expects to see, dreads to see, or confidently hopes to see, that one is likely to see. Fear can make the shapes of the window-curtain into a human form enveloped in a shroud; and then, when we have seen the same object with cool after-thought and inspection, it is by no means the same. No; now we *cannot* see it as we were forced to see it just a moment before. It is the "believers," as a rule, that see the spirits, and the "unbelievers" either see nothing at all or else see something entirely different.

Influence of Will on Sight.—Within certain limits —strange as it may seem—one can decide what one will see. By an act of will the man who is skilful with the microscope can exclude from the attention the images belonging to one eye; in the same way one can bring out in consciousness the parts of the retinal field which lie in "indirect" vision. When, in uniting two flat pictures by use of a stereoscope, a conflict of outlines or of colors takes place, some persons can decide the conflict by an act of will, and say which outline or color shall triumph. It has very recently been discovered that a considerable number of persons can learn to control the retinal field so as to make some simple figure—like a cross or a circle—appear in it, by willing steadily that it shall do so, for some time (ten to fifteen minutes). A few can make a cross of some chosen color start out almost immediately at will. Some few also can produce in the

same way such vivid hallucinations—for example, the picture of a deceased or an absent friend—as that the hallucinations are equal in intensity and clearness to real perceptions; and in rare cases will even cover real objects so that the latter cannot be seen through the object produced by imagination and will.

Illusions of Sight.—What has just been said shows that *no fixed line can be drawn between illusions of sight and perceptions of sight.* There is no reason indeed, on grounds of sight only, to doubt the reality of most of our visual perceptions. The testimony of others, and the testing of the other senses, confirms the conviction that sight has reported truly. But so far as sight goes, our perceptions may be just as clear and strong and yet not correspond to the reality. Errors or illusions of a great variety of kinds may be noticed, some of which admit of easy explanation and some of which do not. Errors of sight in respect to size and distance are common enough. The size of the sun or moon, for example, is very different for different persons, according to the illusory place at which they locate the object; to some these bodies appear no larger than an orange, but to others larger then a cart-wheel. The size of things seen with tired or lamed muscles of the eye is increased. The shape of things changes totally as seen from a different point of view. A startling example of this is found when we look down at a human face, standing back of the head when the body is lying flat on the floor; or when we stand

on the brow of a hill and look at the valley below with our own head between the legs.

Many illusions result from the nature of the "environment," either as seen or as suggested. The sides of a triangle seem smaller than the equal sides of a square; those of a square than those of a five-sided figure, etc. To illustrate further: take four lines of equal length, and then at each of the ends of one line draw an obtuse angle, of another an acute angle, both directed *away from* the lines; then treat the other two lines in the same way, only directing the two angles *toward* the connecting line. Then notice the effect on the apparent length of the four lines.

Illusions of motion of various kinds abound, as any one knows who has travelled by cars and studied his perceptions of sight. Art, too, has innumerable illusions; indeed, without illusion no art is possible which appeals to the eye. We sometimes complain of this as though we were "deceived" (and so had some right to complain) by art. But the truth is that the "reality" of things, as they are to our visual perceptions, is truly given by art, and not by instantaneous photography or as figured out by mathematics.

Thus we see that the explanations of our errors in the use of the senses are precisely the same as the explanations of our successes. For *all vision is "interpretation," and from partial or mistaken interpretation all degrees and kinds of illusions and errors result.*

CHAPTER VIII

MEMORY AND IMAGINATION

MERELY having mental images recur in consciousness, under the so-called laws of association (see p. 84f.), does not amount to remembering or imagining any particular thing, in the fullest sense of the words, "memory" and "imagination." Especially is this true of the former of these two faculties. For a full act of memory must be expressed in some such way as this: "I remember that I (or he) did so and so, at such a time, etc.;" or "I remember it to have happened thus at such a date." Here it is plain that some particular experience (the action of my own, or the occurrence of the event) is placed in *past time*, and is affirmed to belong to *my* experience —to *me* the same person now remembering, who formerly had the experience. What, indeed, could well be more absurd than to try to conceive of one person as remembering another's internal experience; or of ourselves as remembering what is still in the future instead of what has been in the past. "Consciousness of time," and "consciouness of Self," are therefore necessary to developed memory.

Difference between Memory and Imagination.—No little difficulty is sometimes experienced in determining where genuine memory ends and imagina-

tion begins. Thus we often ask ourselves or inquire of others: "How much of all this are we remembering as something which actually occurred, and how much merely imagining?" Even in the case of the most careful and accurate people, it is sometimes impossible to decide such a question. And probably we have all honestly been in doubt about ourselves: "Now, am I really remembering or only half imagining that?"

The science of psychology finds the lines between memory and imagination difficult to draw strictly. And yet, if extreme or even well-established cases of each are selected and compared, it is plain in what, in part at least, this difference consists. The main difference here seems to have to do with a sort of "belief in reality." What we certainly remember is what we once knew *really* to exist, or *actually* to occur; whereas, what we imagine, we somehow exempt from any such obligation to reality. But nothing "has really been," or "has really occurred," except *in the past*—as indeed the very tense of the words signifies. Any number of beings, or of events, can be imagined, however, as possibly having happened in the past, or as possibly now existing or happening, or as going to exist or to happen in the future. For imagination is not bound, as memory is, to the past.

Hence there is a peculiar kind of *recognition* which belongs to memory. In imagination this recognition is suppressed, as it were. Thus, for example, when we meet a person who seems somewhat famil-

iar, but we cannot tell precisely who it is, we say either, "I cannot quite remember you;" or, "I am not sure that I recognize you." Recognition therefore enters into complete memory; but it is not all there is of memory. For we also say of the friend that passes us by on the street without perceiving who we are (here there is no question of failure of memory): "You did not recognize me." Recognition then enters into complete perception also; and this shows that, often at least, perception involves a certain kind of memory. When, on the contrary, we picture to ourselves some scene in history about which we have been reading, or build our castles in the air, and place ourselves as very rich and quite happy in them, we do not employ recognition in the same way. We cannot recognize the scene in history, because it is not represented as belonging to *our* past; we cannot recognize ourselves in the charming pictures of reverie, because they lack the reality of that which is recognized as actually existing in *the past*.

Thought and Memory.—These two faculties are indeed necessary to complete each other; but they are not the same activities of mind. So we bid ourselves or others: "*Think* and see if you cannot remember;" "*Think* and remember more clearly and fully." Thinking is thus used to recall, to clear up and complete, and also to verify the memory picture. And thinking is plainly also necessary to any elaborate use of the imagination. To be sure, much of the most beautiful work of imagination comes, as it

is said, "without the effort of thought." And little good poetry indeed is produced by trying, as did the old woman in one of the Dutch novels, who sat down with pen and paper, determined to make verses; and sat there and sweat hard without bringing anything to pass. But here it is not, properly speaking, the absence of thought which is emphasized in the activity of imagination, but the absence of effort to think. Yet this "play" (or work) of imagination, although requiring thought, is very different from the "work" (sometimes seeming like play) of the thinker over a hard problem in mathematics or philosophy. All this, however, will be better understood later on.

Thinking, remembering, and imagining are then all of them dependent upon reproductive and representative faculty, but in different ways and different degrees.

Stages of Memory.—It is customary to say that there are three stages or processes in memory: and these are (1) retention; (2) reproduction; and (3) recognition. The figure of speech which invites such a form of statement is perfectly plain. Past experiences—the objects perceived, or imagined, or thought—are considered as having a sort of existence apart from the conscious activity of the mind, as it were; and the mind is considered as though it were a sort of receptacle or chamber in which they can be "stored" or retained. Thence are they reproduced or recalled, either by our own choice and with some practical end to be gained; or else they get "suggested" by some current experience, and

so arise again involuntarily within the conscious mind. Psychology has been defined as the science of the states of consciousness, as such (p. 7). Now, the only fact of consciousness here immediately concerned is this: WE REMEMBER. But what we remember is directly known as belonging to our past; and why we remember this rather than something else is also indirectly known to depend on the power of the association of ideas.

Memory as Retention.—When facts or thoughts are spoken of as "stored" away in the mind, or one person, rather than another is said to have "vast stores of memory," a convenient but misleading figure of speech is used. Objects of past perceptions, whether with eye or hand or whatever sense, and ideas produced by imagination and thought in the past, are not real existences. When the mind ceases actually perceiving, imagining, thinking, the perceptions, images, thoughts cease to be. Neither is the mind to be considered like a chamber or garret in which cast-off garments and disused furniture may be stored for future possible use. Retention, then, as a mental faculty, is a pure fiction. But reproduction and recognition are actual mental processes, real and living activities of mind. Like all other processes and activities, they have certain conditions which require to be known. And it is this which causes a resort to the fiction of retention.

Conditions of Retentive Memory.—These are partly physiological, and have to do with the condition and action of the tissues of the brain; and they are partly

mental, and have to do with the activities involved in acquiring or recalling or recognizing past experiences. No other mental faculty is so obviously dependent upon bodily conditions as the memory. In the first place, it would seem as though the faculty were not well established earlier than from five to seven years of age. Children who become blind earlier than this period have in after years little or no memory of what they saw in infancy. In old age failure of memory is one of the things about which complaint is most frequently made. The results of loss of memory through the effects of fevers upon the brain are extremely curious. We hear of one man who, in this way, lost all memory of the letter *F*. Sound and well-nourished brain-tissues, with a constant supply of pure blood, are plainly to a high degree the necessary physiological conditions of retentive memory.

It is in general *interested attention which is the principal mental condition of retentive memory.* What we *attend to*, that we remember most tenaciously; that is most apt to "cling" in the memory. Yet, in spite of this rule, there are not a few instances of trivial and worthless things, to which little attention has been given, getting "stuck fast" in memory; while things which one has been interested to learn, and has attended closely to for the purpose of learning them, keep "slipping" quite away. In many of these cases, however, it appears that such trifles happen at first to strike the mind forcibly because of their connection with things that were interesting;

or because they occurred when the mind was in a condition of aroused and receptive consciousness. But especially does the way in which any new experience "fits in," as it were, with the whole aptitude and habit of mind determine whether it will be retained or not. A boy, who cannot possibly remember over night a short lesson in geography, can remember for months all the details of a base-ball game. Here both interest and attention, on the one hand, and aptitude and habit, on the other hand, are favorable to retention.

Memory as Reproduction. — The principles under which mental images recur in consciousness have already been discussed (p. 79f.). But, plainly, something that is broader and deeper than this is needed to give insight into the working of memory. One writer has said, in a poetical way which suggests much truth: "Every case of memory is a case of sympathy." That is, whatever I remember is my own, not only because I have experienced it, and can remember only my own experience, but also because I recall it at this time in accordance with all my mental characteristics, in full "sympathy" with the mental being that I (and no one else) am.

Among the considerations which fix limits to memory and determine what shall be the suggestions that guide the thoughts of the past are those belonging to the race, or to the social set, or to the profession, etc. When the memories suggested by the surroundings seem quite out of harmony with the surroundings themselves, the whole mental life

may be much disturbed. In a foreign land, where everything is so totally different from that to which one has been accustomed (Japan, for example), one may almost doubt whether one is now dreaming or whether what one remembers of one's own past is not mere dreaming. How must the memories of the wealthy and once honored criminal be confused by the surroundings of his felon's cell and his coarse food and prison-garb! Language, too, which we all find ready-made for us by the developed culture of the race, marks out certain lines in which suggestions are obliged to operate. Hence much of our memory becomes "word-memory," or memory of symbols of some other kind. Bodily and mental health are of the greatest influence here. Sometimes the pace of memory is so rapid that its trusty character is all broken up; sometimes it is so slow that it will not reproduce in recognizable form our past experience. "Atmosphere," or the tone of our whole present surroundings as in sympathy with our present thoughts and feelings, influences mental reproduction greatly.

Memory as Recollection.—The word "recollection" is sometimes employed to describe such acts of mental reproduction as are voluntary; *we*—with some end set as a purpose before us—remember. In this case we often seem to ourselves to be trying to "get hold of" the memory-images; we are seeking for "clews" to them. Such a process implies, of course, that some sort of memory has already taken place; for one cannot try to recollect any particular ex-

perience without knowing something about what it is one wishes to recollect. In recollecting, then, one is really trying to reproduce more perfectly what has already been, but only partially and imperfectly reproduced. Sometimes such "trying" is accompanied by a painful sense of mental effort and even by marked pains of body; and this shows the exhausting work which the nervous system is being called upon to perform. Weariness and the feeling of confusion and of anguish are not infrequently produced in this way. At other times, however, in joyful obedience to the will, the memory-images come before us—orderly, clear, and strong, and ready to do our bidding.

Memory as Recognition.—It has already been shown (p. 124f.) how necessary recognition is to the fullest and highest use of the faculty of memory. This has sometimes -- and very properly -- been called the "spiritual" activity in memory. And, indeed, it seems to indicate a behavior of the mind that cannot be accounted for as in any way parallel with the physical conditions of memory, whether considered as retentive or as reproductive. *I* recognize this *as mine*, as belonging to *my* past. The past is really gone and never can return; this experience of memory is not like the original experience which it represents, as we say. For example: I saw my friend, who is now dead, a year or ten years ago; I remember him distinctly now. I knew him by perception then; I know him by memory now. In some sort, he is the same as known in these two ways; and I, who now

remember him, am the same that once saw him: In some sort, then, *every act of memory with recognition transcends the present, and connects the present into a known real unity with the past.* No wonder that a great philosopher regarded this as one of the profoundest of all mysteries; and yet every man has this experience every day of his life.

Kinds of Memory.—There are as many sorts of memory as there are mental activities concerned in knowing things to be remembered, or as there are classes of objects that admit of being "committed" to memory. Thus there is a memory of the eye and a memory of the ear, or a good visual and a good musical memory. There is also a good or a poor memory of the skin, muscles, etc.; and a memory for words, or for abstract thoughts, or for different kinds of facts and principles. A "tenacious" memory is one that forgets relatively little, although it may be either prompt and rapid, or slow and hesitating, in reproducing what is remembered. A "spontaneous" memory is one that works easily and rapidly, with comparatively little excitement or "prodding," as it were. Some men have "prodigious" memories; and this would seem to require both tenacity of memory and promptness in reproducing. Such memories may be special, like that of the painter who reproduced from memory the altar-piece of Rubens, or of the mathematical genius who could remember a row of 188 figures after a few glances at them; or else general, like the memory of Locke and Niebuhr, who were popularly said never

to forget anything, whether facts or principles, views or feelings, sights or sounds.

Art of Remembering.—The really best art of remembering is to observe carefully the conditions of memory; that is, to keep a sound and well-nourished brain, not to overstrain it in any way, and to put the attention earnestly into what it is wished to remember. Besides this, great art may be exercised in connecting the particular thing to be remembered with the whole structure of our experience, as it were. The more "natural" this connection is the better it is. But there are many things, like dates and lists of names, etc., which it is sometimes desirable to have on call, for the mastery of which one may properly resort to some of the so-called "artificial" systems of memorizing.

Good memory requires also that we should, as far as possible, observe certain rules in "committing" to memory. Some of these rules can be determined by experiment, such as: (1) Do not undertake too long tasks of memorizing in one effort; (2) try to find some meaning in what you attempt to learn; (3) repeat the early attempts at memorizing as frequently as possible without excessive fatigue. (Here recall what was said (p. 70f.) about the fading of the memory-image.)

Nature of Imagination.—It has been seen that mental images associated under the principle of contiguity (see p. 85f.) are concerned in the faculties both of memory and of imagination. It is the absence of reality (see p. 124), and of recognition, as

belonging to the past of one's self, which, in part, distinguishes imagination from memory. But the other side of this difference is that imagination is not bound by facts or within actual time past, as memory is. Hence the wonderful impression of "freedom," which belongs to the higher activities of the imagination. The man without imagination has been said to be related to the man gifted with it, as "the mussel fastened to its rock, that must wait for what chance may bring it, is related to the animal that moves freely or even has wings." Yet, as we shall now see, imagination gets all its materials from actual past experiences, while it passes far beyond all possible experience of what is actual, in the form into which it puts its materials; and it never operates independently of all conditions. Such operation would indeed not be "freedom," but disorder; and the result would be the unintelligible.

Conditions of Imagination.—Since all imagination involves reproduction in the form of mental images, the conditions of mental reproduction belong to all imagination. The most highly "creative genius" *creates only as he also reproduces.* Let it be supposed that one is asked to imagine a line extended indefinitely; or to imagine what is meant by saying "Parallel lines do not meet, but are everywhere equally distant;" or "A point has position but no extension in any dimension." Then one must already have had enough experience which one can reproduce to know what drawing a line (in imagination) means: what the "meeting" of lines means, etc. Even to imagine

a straight line at all, or to imagine any particular line as extended, one must have perceived lines and have experienced what it is to extend them.

It would be an interesting inquiry, but far too complex for our present purpose, to ask whether any object can be imagined without setting agoing, at least to some extent, the very machinery, so to speak, of body and mind that would necessarily be employed in first knowing that same object. When, for example, I imagine with the eye a line drawn to the left, do I not slightly move, or tend to move, the eye in that direction? One writer on psychology has proposed to test this question by such experiments as the following: Open the mouth very wide, and then try to imagine a word which (like "bubble" or "toddle") cannot actually be spoken without bringing the lips or the teeth close together; and can you do it? At any rate, a very close connection exists between the imagination of certain performances or of certain conditions, whether of mind or body, and the suppressed beginnings of the same performances and conditions. It is hard to imagine what rage is, with jaws dropping down loose; or what grief is, with head erect and an assumed smile on the face, and a good breath of pure air drawn well down into the lungs. Here the study of the postures of actors, and of the insane, in connection with their voluntary or involuntary play of imagination, is very instructive.

Reproductive and Productive Imagination. — It is customary to speak of two main divisions of imagination: (1) reproductive, and (2) productive or

creative. These terms are, however, only relative. The dreams of men are usually given as instances of reproductive and purely passive imagination. And it is true that most dreams seem to be played off before us (sometimes to our amazement or our amusement), rather than constructed by us according to an accepted plan. And yet the mind is a great artist in dreams; in sleep it oftentimes constructs the most wonderful dreams out of very little material, whether of sensation or of memory. Some dreams, whether by day or by night, do indeed run helter-skelter; but then so do some of our "thoughts," as we call them. The real difference, which ought to be emphasized, concerns the amount of conscious recognition as suited to some plan or ideal end, which is given to the work of the imagination. It may entirely run away with us, in spite of all efforts to restrain it; or we may let it run away to see what it will do for us; or we may more deliberately control it for an accepted end.

The fact is that every man's so-called "creative" imagination obeys certain limits, some of which are rather arbitrary and whimsical, and some of which belong to the laws of all reality and of all mental life. Thus, no man can imagine anything as taking place without occupying some time; but it would be difficult for one not acquainted with the telegraph to imagine that distant communication could be made so rapidly as it actually is in this way. Perhaps few can easily imagine water as burning up, until they have actually seen it do so; and it is said that a cer-

tain king of Siam could not imagine water becoming solid enough for elephants to walk upon. We often hear some one saying, "I cannot imagine it," on being truthfully told what another person has known actually to occur.

Creative Imagination.—Some further explanation seems desirable regarding this form of the faculty of imagination. The main thing to notice is that it is always constructive and works toward a plan. It therefore implies a certain previous development of experience with things, with ends to be reached, and with the means of attaining them. It is also regularly accompanied by *desire to produce something* that shall be novel or new—in the sense of combining the results of past experience into some form not hitherto realized. The interests which it serves may be as varied as all life and all art—from those of the little girl who designs patterns for the clothing of her dolls, or the cook who "gets up" a new dressing for a salad, to the lofty imagination of the great musical artist or of the scientific discoverer.

In all imagination of wholly new creations the mind takes its point of starting from one or more memory-images; and then, by processes of combining and modifying, it pictures the newly created object. It would be a great mistake, however, to suppose that the mind always, or generally, sees its end from the beginning. There is uniformly something mysterious, something even that suggests divine inspiration, about all truly great work of the creative imagination. Mozart's father is said to have recognized it

as "a gift of God," when his son played, in this way, upon the first grand organ which he had ever seen.

Imagination and Other Faculties.—The dependence of imagination upon intellect is suggested by a study of the very nature of imagination itself. The artist or inventor, of every grade and kind, thinks while he also imagines; by this process of thinking he, in part, reaches the results which are ascribed to imagination; and, by thinking, he certainly elaborates and criticises the work of his own imagination. And yet, as has just been seen, imagination in some sort outstrips both perception and thought; and many of its choicest works flash in upon the mind, all ready-made at once, like inspirations from the divine mind. This does not, however, do away with the necessity for training the intellect in the interests of the imagination; the truth plainly is that both these so-called "faculties" work together hand in hand; and no mind can be "great" which is deficient in either of the two.

The influence of feeling upon imagination is also almost incalculable. The actor, for example, plays his part well only as he by a constant activity of imagination enters into the situations and the inner meaning, as it were, of the part. But it is difficult, if not impossible, for most persons to do this without the feelings becoming involved. How impossible must it be to play the part of King Lear without the imagination requisite to picture the father and the monarch in circumstances like his! But

how difficult to do this without the heart being sympathetically stirred! This stirring of feeling, if it does not "run away" with the intellect of the artist, greatly helps and warms his imagination. And to say that imagination chooses materials to combine for the attainment of a chosen end is the same thing as to say that imagination is also an affair of will.

Kinds of Imagination.—There are as many kinds of imagination as there are distinctive uses of this faculty. A distinction is sometimes made between fancy and imagination; but it is truer to the facts to say that fancy is a species of imagination. We may then call by the term "fancy" such acts of imagination as have less regard for what is probable or determined by known facts and laws; such as are less likely to be connected with important practical interests rather than serving to amuse or to "tickle;" and as such are less careful of method and less lastingly pleasing to our feeling of the beautiful.

Imagination may also be spoken of as practical, or scientific, or artistic, or philosophical, or ethical and religious. The great inventor is a man of predominatingly practical use of imagination; he has as an end in view something useful to be done. But it is a serious mistake to suppose that a student of any science can be great without a strong and lofty imagination. Indeed, the meanness and littleness of a considerable proportion of the so-called "scientists" this very day is due to deficiency in imagination. Mathematics and philosophy, too, exercise the imagination in the very loftiest way; they

are only excelled in their demands upon it by the spheres of morals and religion. And here again, the meanness in conduct of many, and also their narrowness in religion, comes largely from lack of imagination.

CHAPTER IX

THOUGHT AND LANGUAGE

MANY psychologists have treated of thought as though it were a separate faculty that follows wholly after perception, memory, and imagination have acted, and so takes the finished products of these faculties and subjects them to a wholly new form of treatment. It is true, indeed, that strength and grasp of thought proper are a comparatively late development. The young are often very quick and accurate in perception and in memory, while the superabundance of imagination in youth is a sort of common-place. But the young are seldom remarkably thoughtful; and thoughtlessness is excused —perhaps rather too readily so, in these days—by the remark that it cannot be expected in early life. For it is experience that makes men thoughtful.

Now, on the other hand, without actually "thinking"—in the sense of the word which psychology is compelled to recognize—it is impossible even to gain any experience whatever. For activity of the intellect is necessary even in beginning experience. *Perceiving things is "minding" things; and so is remembering or imagining them.* This somewhat difficult truth we shall now try to make clear.

Discriminating Consciousness.—Thus far states of

consciousness have been spoken of chiefly as though they were passive—mere conditions into which the mind is thrown by the stimulus of sensations or by the incoming of ideas. But there is no state of consciousness in which the mind is not also active; indeed, this appeared true when attention was spoken of as belonging to every mental state (see p. 23f.); and when every state was considered as being also in one of its aspects a state of doing something (p. 14).

Let it now be noticed, however, that the very existence of any state of consciousness, as known by the subject of it to be such a state and no other, implies activity in discrimination. This statement is not to be understood as though a faculty called "intellect" presided over consciousness, as it were, and observed what was going on in it, and then pronounced upon the event as belonging to this or that particular kind of state rather than to some other. The rather must *all consciousness, as such, be regarded as having an active side, as being discriminating consciousness.* So, too, of course, no object of perception, of memory, or of imagination can be known without implying the same activity of the mind in discriminating. Indeed, it is chiefly this very thing which makes us speak of the life of consciousness as "mental." Or, to say the same thing in other words: The working of intellect in this primary sort of way is to be acknowledged in connection with the very beginnings of experience. For this reason such activity may be called "primary intellection."

Physiological Conditions of Intellect.—All thinking,

even of the most rudimentary sort, implies work being done in the brain, which, in intensity and extent of the areas involved, corresponds in some sort to the amount of the thinking. It is not then a mere figure of speech when thinking is called "brain-work." Perceiving, remembering, and imagining are also brain-work; but thinking is pre-eminently so. Experiment shows that as the amount of intellectual activity, of active discriminating consciousness increases, the time required to perform it increases. This time is also a measure in some way of the brain-work. Thus it takes from one-tenth to five-tenths or more of a second longer to perform some simple act of discrimination than simply to react without discrimination. If the number of colors or letters exposed for the quickest possible recognition increases from one to six, then the time required to think enough to recognize them increases from about three-tenths to about eight-tenths, or even to eleven-tenths of a second.

It is also found that the lower animals—for example, dogs—may, after losing parts of the higher regions of the brain, be able to see light and to hear sounds, but without thinking any meaning into them. Such animals are called "soul-blind" or "soul-deaf." We not infrequently detect ourselves in a kind of use of the senses, or of memory, which has very little *mind* in it; and we know that, other things being at all equal, this is a less fatiguing kind of work. But real *mental* work in the way of discriminating makes us sweat or makes us tired.

Mental Activity in Discrimination.—The word "discrimination" has just been used for a lower and yet most general and really rather complex form of mental activity. For when we reflect upon the matter further, it seems as though several different forms of activity were involved in this one. How, it may be asked, can one discriminate without being conscious both of likeness and unlikeness; since a thing can be distinguished from others only as it *is* "like" some past experience or object, and so *is* also "unlike" other experiences or objects? Even so simple a state as a toothache cannot be known as such (a peculiar "ache" that is located in a "tooth"), without being likened to something else; and also deemed unlike yet a third something. And since all mental states, and all objects known in them, are many-sided and complex, it would appear that the mind must select certain elements or sides and relate them to its past experience, if it is to think them at all. But this selection would seem to involve analysis and synthesis. Apparently, then, a number of subordinate processes enter into that complex mental activity which has just been called "primary intellection."

Consciousness of Resemblance.—Whenever we become aware that some state of our own, or some object which we are regarding, "resembles" or is "like" some other state or object, we reach an experience which cannot possibly be described in any simpler terms. One may be able to tell correctly, or not, *what* any particular thing is like; but no

one can tell what it is in general for one thing *to be like* another. This impossibility any one may quickly test for one's self. How would you describe "the consciousness of likeness," except by saying, "Why, it is *like*, etc."? But you would thus appeal to the very form of consciousness which you were trying to describe.

Let it not be forgotten that it is a *form of consciousness* of which we are here speaking—*a being conscious of resemblance.* This experience has to be accepted as accounting for itself. Things that are actually like each other might exist in close neighborhood forever; and mental states that are like other mental states might follow each other forever; and all this, of itself, would not account for the consciousness of resemblance. But this form of consciousness itself furnishes the account of all our ideas and all our knowledge of particular likenesses, both in things and in mental states.

Consciousness of Difference.—Almost or quite equally primary is that mental activity which may be called the being immediately aware of the unlike, or the "consciousness of difference." It is not easy, or perhaps even possible, to say which of these two forms of "discriminating consciousness"—the "consciousness of similarity" or the "consciousness of difference"—is the more primary. Both are alike necessary to all development of thought. It is a sort of shock, as produced especially by any sudden and marked change in the stream of consciousness, and often accompanied by surprised and painful

feeling, which originally excites and guides the consciousness of difference. The bitter taste that is caused with the design to wean the infant, or the too warm temperature of his customary cup of milk, are instances. Such things occasion a pause, a doubt, a repeated application of the "noticing" power of the mind.

The early years of human life may exhibit a surprising power in discriminating differences in the qualities of objects and in the amounts of things. Recent experiments in the schools of New Haven have shown how this form of consciousness develops, on the whole, from the age of six to the age of seventeen; and yet with certain variations dependent upon age, sex, and obscure individual peculiarities. On the whole, boys are somewhat superior to girls, except in the nice discrimination of shades of color. Men are known to be superior to women in their power to discriminate sensations produced by the divider's points on different areas of the skin (compare p. 99f.). It is very instructive to notice how sensitive children are to differences of quantity, especially where interest is strong. The boy quickly knows when one stick of candy has been abstracted from his hoard of six sticks, at an age long before he can count up to that number. Even crows will sometimes discriminate between four men and five; while infants of four to six years old may discern correctly the difference, as a gross mass, between seventeen and eighteen objects. On the other hand, the suggestions of sight cause most people to

go "quite wild" in their guesses at the difference between two weights.

Comparison.—The effect of the foregoing two forms of conscious activity is very marked upon the character of our ideas. In this way the ideas are, more or less vaguely and fitfully at first, and yet consciously and actively, related to each other as like or unlike. *Instead of being merely subject to their passive flow, we think the ideas under the terms of thought.* Instead of simply recurring as like or unlike states or objects, they are actively compared, and pronounced like or unlike, and related together by an intellectual activity. Such distinctively "mental assimilation" is therefore a distinct stage in mental development beyond that mere fusion of ideas to which reference was made (p. 78f.). It is the dawning of intellect; it is that which is expressed by saying: "I think" this to belong with that, and the other to be different from both. With reference to the same activity we say: "Hold on; let us see; let us put these two things side by side and notice them attentively, and then judge them to be fitly, in our minds, joined together or classed apart." All this implies comparison resulting in what has been called either "assimilation" or "differentiation," according as the objects are judged like or judged unlike.

Primary Judgment.—It was shown that some sort of judgment is implied in all developed perceptions by the senses (p. 89f.). This conscious relating of states, ideas, objects, as like or unlike in quality and quantity, is an act of judging. Or, to express the

truth in general terms: *The conscious affirming of relations of resemblance and difference between the contents of consciousness is the primitive form of judgment.* We are judging in this way constantly. For example, a noise startles us, and we ask ourselves or some one else: "What was that noise?" The question itself implies an excitement of the mind to thought. The answer—"It was a door slammed," or "was a clap of thunder"—is an act of judging which quiets and satisfies the mind. Or, again, a noise is heard, and we exclaim to ourselves, "Two o'clock!" A form appears in the door, and we cry out, "John!" or "George!" But equally, with little or no consciousness of excitement, moment by moment we are *thinking* the objects of the senses, or our own ideas and thoughts; making them thus to be such and no other objects, ideas, thoughts, that are likened to, or differenced from, one another.

Developed Processes of Thought.—It is the custom with writers on logic and psychology to distinguish at least these four conscious activities as involved in all thinking:—(1) comparison, (2) identification, (3) generalization, (4) naming. A few words upon each of these processes is now in place; since they are all modifications of the work of intellect (or the *minding* of things), as it operates to organize and develop experience. Something has already been said about (1) *comparison.* Let it now be noticed, in addition, that all actual objects are very complex. The result is, of course, that each one is like many other objects in some particulars, and in other par-

ticulars unlike. Suppose, for example, one is standing in front of a cathedral in Europe somewhere, which one has never seen before. One begins at once to "compare" it with other cathedrals. It is larger than the one at X.; it is more purely Gothic; it has more steeples or towers; it is built of a different kind of stone, etc. One may, however, compare this cathedral with other churches that are not cathedrals, or with other buildings that are not churches. In all this one would be *thinking* the object, "minding" it, as it were.

But now it is also perfectly plain that in this activity of comparing one is also using (2) *identification.* This cathedral is like, or even unlike, other cathedrals, only as we agree with ourselves to consider all cathedrals as identical, as being the same in so far as they are *cathedrals,* and not factories, or mere stones, or flowers, or fish, or stars. So with the architecture, the steeples, the towers, the windows, etc. Even when we recognize a color as red, or a taste as sweet, we identify it by thought with what we have experienced before.

This process also involves and leads to (3) *generalization* and *classifying.* This cathedral is, indeed, a particular cathedral, right here before us now, and the only one exactly like it in all the world. But in its being a "cathedral" to us, it is first generalized under a class by an act of thinking. And so it has sometimes been said: "Thought is the ordering of the manifold into a unity." Further, this class of objects has also (4) a *name.* It is already, by com-

mon usage, called "cathedral." Whenever one is engaged in the process of mastering any object by thought, one is somehow gratified and assisted by learning its name. Of this, however, more will be said later on.

Stages or Forms of Thought.—It is also customary to speak of three kinds and products of thought. These are called conception, judgment, and reasoning. But it has already been shown that it is judging, in this most primary form in which it enters into all the work of the intellect, that is the very essence of all thinking. So that, properly speaking, to frame a conception it is necessary to judge. Reasoning, too, is only a process of judging, conducted in such a way that one judgment follows another in a recognized dependence upon it as upon its "reason" or "ground." The nature of thought will, however, become more clearly apparent only if it be considered in all its three forms.

Nature of a Concept.—The term idea, or mental image, was applied to a state of consciousness which is "representative" of past experience. For this reason the term representative image was also employed (p. 69). It was further seen that by processes which were called "fusion" (p. 78f.), and "freeing" of the ideas, they may become adapted, as it were, to represent past experience in a way more general, if also less life-like and more vague. It is thinking, however, in the form of judging, which converts the ideas into conceptions. In other words, *a conception of any object, or class of objects, is reached by a united*

activity of the image-making and the judging faculty of the mind.

Such a statement as that just made can best be tested by taking it straight to daily experience. Two classes of philosophers—the Nominalists and the Realists—have held divergent opinions on the nature of conception during a long-period of time. Psychology, however, is interested to ask: What is it that actually goes on in the mind which corresponds to the name for any class of objects? What do you think, or think about, when you *realize* the meaning of a word like "lion," or "man;" or even some more abstract word, like "virtue," or "state"? In every case it will be found that, if any truly mental process is aroused in so-called conception, this process consists of series of pictures of the imagination (more or less vivid and life-like or dull and "schematic"), accompanied by activities in judging. With some persons the picture-making part is more pronounced; with others, thinking in the form of judgment (and, perhaps, also talking to one's self).

Kinds and Qualities of Concepts.—It belongs to logic rather than to psychology to classify concepts as though they were real existences, and to tell how they may be combined into higher and higher forms of judgment. Thus concepts are said to have "content" or "intension," and "extension." By the former is meant the number of common properties which the objects are known to have, that are essential to their being called by the same name. Every lion, for example, must have four legs, or be a "quad-

ruped," must be an eater of flesh, or "carnivorous," etc. By the latter term ("extension") is understood the number of subordinate classes, or of individuals, to which the name can properly be applied. The mistaken statement is sometimes made that extension and intension vary inversely—that is, as one becomes greater the other becomes less. For further details on all these subjects, books on logic may be consulted; but psychology has little real interest in them.

Logical Judgments.—The nature of the mental activity which takes place in all thinking, even the most elementary, has been seen to involve a kind of judgment. This kind of judgment has been called "primary" (p. 147); it has also just been declared necessary to all forming of conceptions. No conception (or "idea," or "notion," as is popularly said) can be had of a "lion," or of a "man," or a "flower," without picturing and judging it to be like some particular object and unlike some other object. But, on the other hand, these so-called conceptions, or condensed results of thinking, become, in turn, the terms which are united into more elaborate judgments. To take the same example, if one learns that a lion is a "quadruped" and "carnivorous," whether by actually counting his legs and seeing him eat flesh, or by being told about him, one is then prepared to pronounce the judgment: "A lion is a carnivorous quadruped." This particular judgment thus unites a conception (lion), which is the subject of the sentence, with two other conceptions (quadruped and

carnivorous), which are the predicates. It appears, then, that *a logical judgment is a mental act uniting conceptions, or "condensed" results of past acts of judgment, which are already familiar to us and which have previously been fixed by names.* For in this case we know, at least, what it is for an animal to have legs, to eat flesh, etc.

Forms of Judgment.—The mental act of uniting (or "synthesis") may take place under any one or more of several forms. Among these the following are the most important: (1) *Resemblance* or *difference.* This has already been seen (p. 148) to be the form most familiar in the primary judgment. Now, suppose, however, that one sees in a collection of wild animals an unknown kind. "What is it?" is the question which rises to the mind and to the lips. It is *like* a tiger, because it has stripes and is whitish on the under side of the belly. But it *is not* a tiger, because the stripes are faint along the sides and brownish-yellow above; while the tiger has plainly marked black bars on a bright orange-yellow ground. It is an animal; it is a quadruped; it looks carnivorous; it is most like a tiger; but it not enough like a tiger to be one. What, then, is it? Its name is "a jaguar;" one henceforth, then, judges the jaguar to have the resemblances and differences which one has thus marked.

(2) *Space* and *time* give us forms under which certain logical judgments fall. Thus the inkstand is related to the table as being *on* it; and the ink to the stand as being *in* it, etc. One thing is "far

to the right" and another "near by on the left" of us. This day is "after" yesterday, in time, and "before" to-morrow. Judgments of relations in space and of quantity, judgments in geometry and arithmetic, are of this order.

But one of the most early and interesting of all the forms of judgment is (3) that which attributes an *action* to an *agent*. Very early in life—it cannot be told how early—the judgment which refers our experience to what is done by things acting upon us, or upon each other, is framed. When first the infant says "hot," on pointing to his steaming cup of drink, he probably is not simply judging that an attribute belongs to a subject, but rather that a thing will, under certain circumstances, do something to him (namely, burn him). On this effect of our own conscious activity upon our judgments and our reasonings we shall remark further in another place.

Language and Thought.—It has already been seen that the "naming" of things, and of our own states of mind, our ideas and thoughts, is an important part of thinking itself. This fact has occasioned the inquiry as to "the relation of language to thought." Connected with this main inquiry are many subordinate inquiries, such as, why the lower animals cannot invent and use language, how far thought is possible without language, etc. Into these matters we cannot, of course, here enter at length. It should be remembered, however, that it is one thing to say that thinking cannot develop to any extent without the aid of *some kind* of recognized symbol for its

products, and quite another thing to affirm that *words*, as the peculiarly human symbols of thoughts, are indispensable to all thinking. The latter proposition certainly is not true. The deaf and dumb can think very elaborately by helping themselves with symbols which appeal to sight. In the novel, "God's Fool," it is shown, in accordance with a true psychology, how conceptions may be elaborated and communicated to one blind as well as deaf and dumb, by tracing symbols on the skin. Probably, however, without some kind of recognized sign to accompany, and, as it were, to sustain thinking, it could not go on; and without words joined together in the form of judgments the mental processes tend to become a mere succession of acts of image-making. On the other hand, with the use of words, the symbols themselves are glibly united so as often, with little or no real thinking underneath, to bring the mind to the same practical conclusion as that which would be reached much more slowly by stopping "to think ourselves through," as it is customary to say.

The Nature of Language.—It is natural for man, under the influence of any strong feeling, to open his mouth and send forth some peculiar and expressive sound. The lower animals, too, have their natural cries and expressive sounds, as well as other symbols which signify something to other members of the same species. But none of them have anything like the nicely modulated power of hearing and of utterance which man readily attains. So that *sounds* are with man his most easy and appropriate gesture;

although they are greatly helped out, in the case of some races and of individuals of all races, by other forms of expression. Thus it has been said: "Speaking is the instinct of man; man builds speech as the bird its nest." But these instinctive and expressive sounds are not, as yet, genuine words. They must themselves come under the influence of the very form of mental life which they are fitted to serve; and this is thought, ending in what has been explained as the forming of conceptions (p. 150f.).

Words and Thoughts.—To convert a sound into a genuine word, it must be used as not simply a symbol of some mental state, but as a so-called "movable type." That is, it must be intelligently employed as standing for what we have already seen to be general in nature, and to belong to a whole class of objects, as made known to thought. Even those students of the mental life of the lower animals who are most favorably disposed to rank it highly, are pretty well agreed that these animals do not use their various symbols as "movable types." This is not only because their organs of hearing and of utterance are so inferior to those of man, but also because they are not capable of thinking as man learns to think, and in the highest sense of the word. A pretty story from the French of M. Taine will illustrate this: A little girl of only eighteen months had been accustomed to play hide-and-go-seek with her mother, calling out, "*Coucou.*" She had also been told about things hot, "*Ça brûle*" ("that will burn"). On seeing for the first time the setting sun disappear sud-

denly behind the hill, she cried out: "*À b'ûlé coucou*" ("The burning thing is playing hide-and-go-seek"). This infant had made a grand "generalization," as we should say; and she matched it by using words "as movable types." It seems quite certain that no animal, however intelligent, ever performs an act of real thinking or uses the symbols of its own mental states in a way to equal this infant of eighteen months.

Origin of Language.—The debate has been very long and hot as to how language could have originated. It is a question which the science of mind can answer only in one way. Language originated and has developed as both the expression and the essential aid to the development of mental life. In different races and individuals it marks the character and the amount of mental development as no other sign does. But it also gives conditions to mental development. So that those who are born into the inheritance of a highly organized language —like Greek, German, or English—are, in that very way, invited and almost compelled to think and to feel in accordance with it.

CHAPTER X

REASONING AND KNOWLEDGE

WHEN speaking of the stages or forms of thought, (p. 150) reasoning was mentioned as the last and most elaborate of them all. Yet incredibly swift instinctive reasoning enters into all our daily life, even into those mental acts which seem to be the results of immediate perception by the senses. For example, we hear a noise, and say: "The train is coming;" or we hear a succession of sounds, and at once declare: "There is a fire near the corner of *A* and *B* streets."

Reasoning in Perception by the Senses.—It is plain that a sort of reasoning may be implied in such perceptions as are expressed by the sentences: "I hear the train coming;" or "I see Mr. Smith coming down the street." This fact may be brought out by supposing a pause before the judgment which results from perception is pronounced; and that this pause results from a doubt arising in the mind. To keep the same example: suppose we are not quite sure whether it *is* the train coming or the rumbling of distant thunder which we hear; or are in doubt whether it *is* indeed Mr. Smith, or is Mr. Brown, whom we see coming down the street. In such a case we should be disposed to listen or to look more

intently, so as—note the expressive phrase—to "make up our minds." It is also plain that in this very process of making up the mind, more or less of reasoning might be done. Careful listening or looking might result, without our knowing why, in its being "borne in upon" the mind that the noise was, after all, thunder, and not the train; that the person approaching was, after all, Mr. Brown, and not Mr. Smith.

But it is not nearly so easy to suppose we could attain the knowledge, that "there is a fire near the corner of *A* and *B* streets," from merely hearing a succession of sounds, and without more or less of conscious reasoning. For let a case like this be examined somewhat more closely. What is really heard is only a succession of sounds of a peculiar quality, intensity, timbre, etc. If they have been associated by past experience in such a way that they are now heard as "the sounds of the fire-bell," there need be no present conscious act of reasoning. But these sounds are also heard in a certain peculiar order and up to a certain number; let us suppose, at first, five in succession, and then, after a longer interval, four more. This signifies to the mind that the fire-bell is striking for Station 54. Here, again, little or no conscious work of reasoning may be done; although it is likely that the flow of the mental life could be expressed in some such succession of judgments as the following: "Fire-bell is striking—five times, four times; that means Station 54." But now shall it be said that there is no added

reasoning needed to reach the judgment—"There is a fire near the corner of *A* and *B* streets"? Here, too, the actual amount of conscious reasoning would plainly depend upon the character of the previous experience. For to the mind of the chief of the fire-department the alarm 54 is an immediate excitant of the thought of a fire in that locality. But for the stranger in town it might lead simply to an inquiry, which could be answered only by a concluding judgment that must be itself reasoned out.

Nature of True Reasoning.—It is now possible to see more clearly what is the real nature of all those mental acts which are entitled to be called "acts of reasoning," in the highest sense of the word. For suppose that, in the foregoing case, or in any similar case, after a thoughtful pause, the conclusion follows as something consciously derived from certain "reasons" or "grounds." How do you know that this succession—five and then four—of peculiar sounds means a fire at the corner of *A* and *B* streets? *Because* I see that it says so on the card I have taken from my pocket; or *because* I remember hearing a fireman say so only the other day. Whenever we are conscious of making such a connection between two judgments as that one of them is related by us to one or more other judgments as finding in them its reason or cause, then we are "reasoning," in the highest sense of the word. In a single sentence: *Genuine logical inference, or reasoning, takes place whenever two judgments are mentally related in such manner that one is made the "reason" (or "ground") of*

the other, with a consciousness of the relation thus established between them.

The much-debated question, whether the lower animals are capable of reasoning, must be considered in the light of this definition. There can be no doubt that they often appear exceedingly ingenious in adapting means to ends. Some of them, which do not appear, as judged by the perfection of their nervous system, to be among the highest in the scale of intellectual life—such as ants, bees, and many kinds of beetles—exhibit signs of wonderful "intelligence." Some of the plants also give signs somewhat similar. Unlike most plants, however, the higher animals frequently break the bonds of habit, and thus do things "out of their usual line," as though in adaptation to an emergency. Bright children astonish us by signs of apparent extraordinary intelligence of the same kind. Yet, if we question them *as to why* they concluded that this, rather than something else, was the proper thing to do, they can perhaps give no "reason" or "ground" as having occurred to them. It is doubtful whether an animal ever "reasons" in the sense of the word which has just been explained. For example, does the learned dog which has been taught to bring his master an umbrella, if it is raining, but a cane, if it is fair, ever really conclude: "The umbrella is the right thing, *because* it is raining;" or, "Since it is fair, *therefore* the cane only will be needed"?

Nature of the Reason, or "Ground."—It has just been seen that *reasoning*, properly speaking, *involves*

conscious recognition of a relation between two or more judgments; such as that one of them is "concluded" from the others as its "reason" or "ground." Thus we often say, "I can see no good reason for that;" or, "You have absolutely no ground for your conclusion to stand upon." And now the further inquiry might be raised: What is it, then, for one judgment to stand related to another as to its reason or ground? What is the essential thing about this very relation of judgments in every act of reasoning? And here the books on logic point to the nature of the so-called "Middle Term."

Let us take an example. Suppose that I see a crocodile, or read a description of one, for the first time. Now, the question arises whether a crocodile is a mammal or not (that is, whether its young are born, and nursed by the mother, or hatched from eggs, and not nursed). I inquire to find some "reason" or "ground" for judging one way or the other—that is, for the conclusion which I am to make as the reasonable and well-grounded one. I observe, or am told, that the crocodile is a cold-blooded animal. I remember that all mammals are warm-blooded animals. And at once I draw the conclusion, as the necessary and inevitable thing: "The crocodile is not a mammal." This act of reasoning may be expressed as follows: Not-a-mammal is affirmed (or predicated) of the subject crocodile, because not-warm-blooded is affirmed of it; whereas, on the contrary, warm-blooded must be affirmed of every mammal.

If, now, we throw the statement of this mental process into general terms, and then express it by the relations of letters, we may choose any one of several forms. We may say, for example; *S* is (or is not) *P*, because it is (or is not) *M*; or, If *S* is *M*, then it is also *P* (why? *because M* is *P*); or *because M* is *P* and *S* is *M*, *therefore S* is *P*. All the while, however —and in whatever way the case be put—it is our knowledge of *M* which determines whether we shall conclude that *S* is or is not *P*. In the case just given, being "warm-blooded" is the "middle term," so-called, and it determines that the crocodile cannot be concluded to be a mammal, because all mammals *are* warm-blooded, but the crocodile *is not* warm-blooded.

It is in view of this relation of the middle term in every act of reasoning, to both parts of the concluding judgment, that reasoning itself is sometimes called "immediate judgment," or *judging through some mediating conception*, or middle term.

Kinds of Reasoning.—There are, of course, as many principal kinds of reasoning as there are principal kinds of relations which different classes of objects may sustain to each other. And here let us refer at once to the different main kinds of judgments (see p. 153). First, there is reasoning along the line of resemblances and differences. If two things are both sufficiently like a third thing, then they are like each other; they belong to one class, and deserve a common name. What it is to be "sufficiently like" can never be determined once for all. Hence

the classifications of the sciences, with their names, are constantly liable to change. New and important differences in things hitherto thought to be "sufficiently alike" may be observed; and this observation will "upset" our previous conclusions regarding them. Second: some trains of reasoning—as in mathemathics and measurement—argue about quantities and their relations, comparing them with one another through one or more middle terms, and thus drawing conclusions as to equality, or difference, in a great variety of subordinate forms. Yet again, third: some change may be noticed and the conclusion drawn that it is due to the action of some particular agent; for the reason that something which is known as a common sign of that agent is connected with that particular change.

Forms and Figures of Reasoning.—It is customary in logic to distinguish between those forms of reasoning in which a single sentence connects the concluding judgment immediately with its reason, by the words "therefore" or "because" (the *enthymeme;* for example: "The President is fallible, because he is a man"), and the fuller forms in which the grounds of the conclusion are stated in two separate sentences called the "premises" of the argument. As an example of the latter we may make a "syllogism" out of the reasoning about the crocodile—thus: All mammals are warm-blooded animals: the crocodile is not a warm-blooded animal; therefore the crocodile is not a mammal.

Since there are different ways of arranging the

subject (S) and the predicate (P) of the concluding judgment, and also the middle term (M) which forms the link in the argument that binds subject and predicate together, different "figures" of the syllogism arise. These three, as expressed in letters, are customarily recognized:

I.		II.	III.
M is P		P is M	M is P
S is M	or	S is M	M is S
$\therefore S$ is P		$\therefore S$ is P	$\therefore S$ is P

Induction and Deduction.—These two forms of reasoning are customarily distinguished in something like the following way: If a number of individual cases are observed to be all alike in one or more particulars, then we leap to the conclusion that they are alike in all essential respects; that they belong to one class; and that "all" the individuals of this class have these common characters. This is making an induction. It will be noticed that this argument goes from the particular to the general or universal, from the individual case to the class. If, on the contrary, the general principle is already known, and we then come across an "individual" which seems, in *some* respects, to fall under the principle, we at once conclude that this individual falls under the principle in *all* important respects. Here we argue from the general to the particular; from the rule to the case; from the class to the individual member of the class. *So far as the mental action is concerned, however, it is essentially the same in both induction and*

deduction; in both the argument consists in reaching one judgment as a conclusion, by starting from other judgments as its reason or ground.

The instance already used may illustrate this difference also. Suppose that, on first seeing a crocodile, I find by actual observation that it is "a cold-blooded animal." The next animal which I observe that has all the other more apparent characters of a crocodile, I expect to find "cold-blooded" also. If several crocodiles have actually been found to have this character, I do not hesitate to say: "*All* crocodiles are cold-blooded animals;" and great would be my astonishment to find one that was not so. In affirming this general character of the class, I have made an induction. But now I am still in doubt whether the crocodile is a mammal or not. This question, however, I settle by a deductive argument —that is, by referring it to the principle already established: "*No* cold-blooded animal is a mammal" (comp. p. 162).

Principle of all Argument.—But, how—it may be asked—does one venture at all to argue so confidently from what one immediately knows, by observing it, to what is still unknown? Whence comes this assurance that, if several crocodiles are observed to be cold-blooded, we do not need to examine the next one, but may *infer* that it, too, is so? Might not that very next crocodile turn out to be warm-blooded? And what should we do then with our confidence in our reasoning powers? To one of these questions, the answer must undoubtedly be:

Yes, the next animal, which seemed in all other respects like those we had already seen, *might* turn out unlike them even in so important a character as this. Then one of several diffierent things would have to be concluded: Either this animal ought not to be called a crocodile, because it is not cold-blooded; or some crocodiles only are cold-blooded, and there are, at least, two kinds of crocodiles; or else, perhaps, here is an astonishing "freak" in old Dame Nature that she should produce a warm-blooded crocodile.

In any event, however, we should go right on trusting our reasoning powers in general; and, indeed, what choice could we possibly have in such a matter, since we could not even distrust them by arguing against them, except by using them with confidence? Only we should get more and more cautious in our particular inductions and deductions; and this would produce the development desired of these same reasoning powers. For example, a child may be at first inclined to drink from any cup of milk brought to it, or to put out its hand to pat every dog it meets. But being burned or bitten once, it might conclude: no milk is safe to drink, no dog is safe to pat. Yet next it learns the signs of difference, and so concludes: some cups of milk (and what ones) are safe to drink; some dogs (and what ones) do not bite when they are caressed.

The principle which is sometimes said to underlie all reasoning is called "the principle of sufficient reason." But, so far as psychology can go, this simply means that the mind actually does keep

on drawing conclusions on grounds, or reasons, which it deems "sufficient" for that very end. That is, we have now reached an ultimate principle—one beyond which psychology has nothing to offer in explaining the behavior of the mind.

Tests of Reasoning.—The reasons which one is practically obliged to take as "sufficient" for one's conclusions are very different indeed under different circumstances and with different classes of subjects. In mathematics they are of an entirely different order from those which one is obliged to follow in life. And this is not because mathematics is so *real* and the more doubtful practical conclusions so unreal; but just the contrary. It is "pure" mathematics which is totally unreal; and that is one reason why men can argue about it so confidently. Its conceptions and terms can be considered without regard to real facts, by a process of abstraction. But we cannot deal this way with nature, much less with human conduct. In these spheres we can only reach, by reasoning, what is more or less *likely* to be true. It is not *absolutely* certain that the sun will rise to-morrow, or that the man who jumps from a window in the sixth story will get hurt. But those are called "fools" who do not reason and act as though it were so.

The physical sciences are constantly being disappointed and going wrong, in both their inductions and their deductions. The popular impression that they have arrived at fixed, unchanging, and absolutely indubitable laws is quite wrong. But gradu-

ally they are correcting their past mistakes, verifying their correct guesses, and building up a structure of well-reasoned conclusions based on valid grounds.

In testing their inductions, or "jumps" to general conclusions, the sciences make use of certain so-called "methods" or "rules." Among these the following three are most important: (1) The method of agreement; (2) the method of difference; and (3) the method of concomitant variation. By the first rule it is meant that objects or events which are in any way known to have like qualities or conditions may safely be inferred to belong to the same class or to be due to the same causes. By the second rule it is meant that, when objects or events differ in important ways, they must be inferred to belong to different classes or to be due to different causes. And by the third rule it is meant that, where two or more different objects or events vary with proportional intensities, it may safely be inferred that they belong to the same class or are due to the same causes.

Nature of Knowledge.—We constantly hear men saying: "I *know* that this is (or is not) true;" or, "I *know* (or do not know) this object (or that person)." Such a saying excites no surprise; for that knowledge should be, in any sense, a mystery, it has probably never occurred to most persons to suspect. Yet, as one of our modern students of mental life has truly said: "The *relation of knowing* is the most mysterious thing in the world." In view of what

has already been shown as to the nature of perception, judgment, and reasoning, it must be apparent that the popular use of this word "knowledge" is very loose and often inaccurate. Can a man *know* what is not true? Can he *know* that yonder object is a cow, when it is indeed a horse; or that he met Mr. *X.* upon the street yesterday, because he saw him plainly, when Mr. *X.* has already proved that he was a hundred miles away at that very hour? How, too, shall one *know* whether there are or are not ghosts (or black swans or warm-blooded crocodiles); or even that, in some other planet, heavy (?) bodies may not tend to fly away from each other rather than to approach? For if there is any general truth which may be known, it is this, that men have claimed (and do still claim) to know, beyond a doubt, almost every conceivable absurdity.

Shall the word "knowledge," however, be so restricted as to apply it only to what is absolutely beyond all doubt? This would perhaps be found to limit its sphere unduly; for it might appear that, for each one, only his own present state of mind, as such, is known as "*absolutely* beyond all doubt." The final answer to such questions, however, does not belong to psychology, but to a department of philosophy which is called "theory of knowledge."

Belief and Knowledge.—One important truth is brought to our notice by the way in which the word knowledge is ordinarily used. There is a sort of conviction, certainty, belief, in all knowledge. "Belief" is sometimes opposed to "knowledge," as

though the two were contradictory; and, indeed, *mere* belief is not enough to warrant knowledge. But without belief, of a certain sort, there is no such thing as knowledge. It is a curious and interesting illustration of this truth to notice how men bring their fist down hard upon the table, or stamp their foot upon the ground, or "pounce upon" their words with great emphasis, when they are telling what they *believe* they *know*. "It *is* this, and not that," they say in the warmest possible way. "I tell you I know it *is* so." This is not a sentence which most men, when contradicted, are apt to say without some evidence of a glow of conviction. In fact, to say, "I *feel* perfectly sure," is, in popular speech, the same thing as to say, "I *know*." This belief—as it were—slumbers in all knowledge, but is apt to be aroused as soon as what we consider our knowledge is called in question. It has been called an "emotion of conviction" by one writer. It exists as truly in the man who "coolly" (?) refuses to discuss his pet theory in science, politics, or religion, as in the man who affirms his theory with the greatest apparent fanaticism.

Development of Knowledge.—Our past study has shown us that, in no unmeaning use of the words, *all knowledge is a development*. That knowledge of things which we call "immediate," and which comes with the use of the senses, is really a matter of growth. The infant had to learn, and actually did learn, to know its own body, with each of its particular members, its own self, and all the things that

now make up the world of its experience. Yes, since every perception by the senses, and every full act of self-consciousness, is an activity that takes place only as a process in time, it is an important truth that each single "knowledge" is a growth, a development; while no one would think of disputing that the body of knowledge which belongs to the individual or to the race is a matter of growth.

Another truth to be noticed is that, in the attainment and growth of knowledge, all the activities of the mind are involved. That this is true, so far as all the forms of intellectual activities are concerned, is readily apparent. Judgment, memory, imagination, and even reasoning, have all been seen to be employed in attaining a knowledge of things through the senses. Feeling also is undoubtedly involved in the attainment and growth of knowledge. As Goethe says: "All comes at last to feeling;" and "What you don't feel you'll never catch." This is indeed an exaggerated way of stating the truth. But it has just been seen how one form of feeling—a sort of "emotion or conviction"—is found in all our knowledge. The primary kinds of feeling, such as surprise, expectation, anger, fear, and hope, enter into and modify all our processes of perception and reasoning. He who expects or dreads to see any particular object will have what he actually does see influenced by his expectation or his dread. Every sound is interpreted as being this rather than some other sound, under the influence of latent or more obvious emotion. And that the will takes

part in the production of the state of knowledge is seen to be true as soon as we recall that attention is necessary to knowledge, and that the direction of attention is so largely a matter of will; as well as that our knowledge of things is so dependent upon all the use and control of the movable parts of the body; and that this is also so much a matter of will. As to the knowledge of ourselves, we may quote again from Goethe: "How can a man learn to know himself? By reflection never, only by action."

Kinds of Knowledge.—All acts of knowledge may be divided into classes according to two or three different principles. Thus all knowledge is either (1) immediate, or (2) inferential. Immediate knowledge is such as is got in our use of the senses, or in the observation of our own states when we do no conscious reasoning. Inferential knowledge is such, on the other hand, as is reached by consciously reasoning from premises to conclusion, or from one judgment to another.

But if the processes of knowledge are considered according to the classes of objects known, two kinds may also be distinguished. These are: (1) the knowledge of Self, and (2) the knowledge of things. The former might then be said to come by way of self-consciousness (compare p. 30f.) and the latter through perception by the senses. But this would apply only to immediate knowledge; for knowledge about ourselves and also about things requires for its attainment and growth just the same use of the powers of conception, judgment, and reasoning.

Finally, it may be said that by knowledge all the individual experiences are related together so as to become parts of a system. Thus we may think of *the growth of knowledge as a sort of progressive organization of experience itself.*

CHAPTER XI

EMOTIONS, SENTIMENTS, AND DESIRES

IMPORTANT changes take place in the character of the feelings as the life of knowledge grows. As we gain experience of ourselves, and of things and our relations to them, this "feeling-aspect" of consciousness becomes more and more complex. Many curious and interesting mixtures and conflicts also take place among the more simple forms of the feelings themselves; this fact, too, increases the variety and complex character of the more highly developed life of feeling. Still further, many of the stronger feelings especially produce very important and almost immediate changes in the conditions of the bodily organs. These changes in turn make themselves felt by the mind; and this itself produces new modifications of feeling. Once more, there are few or none of the feelings that do not quickly incite the desire to do something. They are themselves either painful or pleasurable (see p. 59f.); and they have reference to objects that may possibly be avoided or gained. As one might say —speaking in an abstract way—they tend to *move* the will; they are "motives" or forceful influences to some form of action. This effect on the mind also makes itself strongly felt.

Classes of Feelings.—It can scarcely be considered strange, after what has already (p. 56) been said, if it is again found necessary to confess that human feelings are too varied and complex to be strictly classified. This is actually the case. There has never been, and there never will be, any wholly satisfactory classification of the feelings. We shall, however, on grounds which will be made more clear later on, distinguish between the *emotions* and the *sentiments*. If, then, those states are also considered, where either the emotions or the sentiments begin to operate somewhat strongly to influence the will, to induce or move us to do something, a third class, called the *desires*, may be distinguished. It is of the emotions, the sentiments, and the desires that this chapter treats. Only it should be understood that the last of the three classes (the desires) emphasizes especially those states in which mere feeling tends to pass over into willing.

Nature of an Emotion.—In order that any form of feeling may become an emotion, two things are chiefly necessary. The first of these is that the feeling itself should acquire a certain intensity. All know well enough what is meant by the intensity of a feeling, just as directly and undoubtedly as they know what is meant by the intensity of a sensation. On account of its so-called internal and subjective character, however, there are no means of measuring the intensity of feelings as there are of measuring the intensity of sensations. When any considerable increase in the intensity of any form of feeling

takes place, this increase soon produces a variety of changes in the condition of the different bodily organs—such as the skin, the muscles, the action of the heart and lungs, and so of the parts used in swallowing and of the whole digestive canal, etc. These changes are now themselves felt; and the feeling *of* them constitutes the second important characteristic of an emotion. *Considerable intensity of feeling and the "tinge" or "suffusion" of consciousness by the resulting bodily developments ("the bodily resonance") are then the more notable features of every emotion.*

Primary Kinds of Emotions.—Some forms of human feeling, which may be classed among the emotions, are of the most elementary and universal character. Not only are they found among all human beings very early in life, but even the lower animals exhibit plain signs of similar forms of feeling. Of these perhaps the most important are anger, fear, grief and joy, astonishment, curiosity, jealousy, and sympathy. These involve, of necessity, only a very low development of mind; but they may be said to be related in the order above named, to the growth of ideas and to the acquirement of experience. For example, if one grasps the hand of a young child, or in any way opposes its free movement, one may arouse physical signs of feeling similar to those exhibited when one sets one's cane in the path of a serpent or a young alligator. Infants also show signs of fear before they can possibly *know* anything to be afraid of. One observer noticed fear of cats

in a girl of only fourteen weeks old; another heard the cry of fear, at the barking of a dog, in a child of the same age. Astonishment is the emotion of strong surprise, and is closely connected with both fear and joy. Curiosity, too, manifests itself in children, as in certain young animals, by a sort of physical and mental restlessness, long before any real "intellectual curiosity," as an affair of intelligent choice of ends, can arise. Even sympathy is originally instinctive, blind, and common to man with the lower animals. Indeed, one may properly use this word for that tendency to "harmonize" our consciousness with that of others, which is quite universal. Children and adults "get mad," and grieve, and fear, and wonder, in company.

Development of an Emotion.—Every emotion runs a course, as it were, although it may seem to spring into being at once. Some idea, thought, memory, or it may be merely sensory agitation, arouses a sort of local storm in certain nerve-centres of the brain. This storm spreads from centre to centre, as it were; it sweeps down the nerve-tracts that lead to the external parts of the body, to the skin, muscles, and joints, to the heart, and lungs, and other viscera. Flushes or chills, shiverings and "goose-pimples," start out on the skin, and its tension over the underlying organs is changed. The muscles become more rigid or flabby than usual; some of them are contracted and others relaxed. The jaws fall or become set; the heart beats faster or slower, or else it flutters wildly and stands still. The character of the

respiration and the condition of the glottis and diaphragm change. Weeping, sobbing, sighing, "catching breath," etc., occur. Strange internal agitations make themselves felt. Taken altogether, this may be called the "bodily resonance," or "somatic reaction," awakened by the effect of the intense feeling on the organs through disturbance of the brain. It mixes itself with the more purely ideal feeling and gives it a coarsened and more strictly "emotional character."

There is an indefinite variety to these bodily effects of the emotions. Each emotion has its peculiar characteristics, and yet individual persons differ in respect of them. Various admixtures of the emotions also take place. In anger the jaws are apt to be set and the teeth grind together; creepings and "goose-pimples" come over the skin. The muscles are tense in those organs needed for offence or defence. But some are pale and some flushed when they are angry; and some tend to run away with fright or collapse with internal agitation, while others tend to "brace up" and fight (either the object that angers them or the passion in themselves). In extreme fear, again, the neck is bent, the jaws and cheeks relaxed, the shoulders collapse, the arms hang, the legs drag, the viscera quiver, the heart beats wildly or stops still. The feeling of these bodily changes intensifies the emotion itself.

But in the case of all strong emotions a climax is reached, and then the storm begins to abate. What is called a "reaction" comes on. *In their highly*

emotional form all the feelings run, as it were, a sort of limited physiological career.

Emotions and Thoughts.—It is not, of course, upon the bodily organs alone that all the intenser forms of feeling make themselves felt. Nothing in our experience is any plainer than the fact that the thoughts are "disturbed" by the emotions. In men of strong character and great self-control, a large amount of feeling may seem to quicken and improve their thinking powers. They are "at their best" when they are strongly *moved* by love, or anger, or even by grief and fear. But the effect of much emotional disturbance upon the thoughts, in most cases, leads in either one of two unfavorable directions. Either the mental images and acts of judgment and reasoning are thrown into a sort of wild confusion, rendered "hurly-burly," as it were; or else they are made stagnant with a kind of paralysis.

This "upsetting" of the mental train, this disturbance of the powers of thought and reasoning, like the bodily changes which accompany it, is itself felt as a profound modification of the original feeling. Almost all know what the feeling is which is so significantly called "losing one's self." Similar conditions of mind may be produced by certain drugs; they also belong to certain forms of insanity. Some insane persons are almost habitually in the emotional state which belongs to the feeling of a wild confusion of the thoughts; others suffer from the constant depressing feeling of a "drag" and impotency in the mental train.

Complexity of the Emotions.—All these forms of feeling—themselves more or less complex—may still further combine or follow each other in a great variety of ways. It has long been noticed, and has been told in many forms of literature, how apt the mind is to pass suddenly from one extreme to another. This involves a further extension of the principle which we have already seen (p. 64f.) to control the succession of pleasures and pains. Not infrequently the most passionate and devoted love follows in reaction upon the most extreme distaste. And few remarks are more common than those which emphasize the proverb—"Love me little, love me long."

So also the seemingly opposite emotions may be almost inextricably mixed in the same experience of the soul. Thus Plato describes the "extraordinary state" of mind in which the disciples of Socrates were when they were watching him dying, as "an unaccustomed mixture of delight and sorrow." So sometimes, as we say, we do not know whether we are most grieved or most glad. The modifying effect of one emotion upon the next succeeding is also a matter of great importance. A certain abruptness of change increases the intensity of the emotions. So that griefs which come unexpectedly "upon the top of" joys or of quiet contentment are more than ordinarily poignant; and no joys are quite like those which bring relief to preceding griefs.

Passions and Emotions.—These two words are popularly employed without any very clear and fixed

distinction between them. Thus the same state of feeling might be spoken of as either the "emotion" or the "passion" of anger, the "emotion" or the "passion" of jealousy, etc. A very important distinction between the two is, however, possible and ought to be observed. *Emotions which have become habitual by frequent repetition and are "backed up" by determined will are more properly called passions.* And this leads a modern writer to say, "Repetition has a different effect upon emotion and upon passion; it weakens the one and feeds the other." In this use of the words, emotions are the more violent, temporary, and sudden; they escape control and rage of themselves, if they become very intense. Passions are more concealed and constant; they are taken up and adopted more by the voluntary man. The one is like a storm of thunder and lightning; the other is the intense and steady heat of tropical summer. Women are more emotional than men, but men are more passionate than women. Strong emotions are sources of weakness; but strong passions may be sources of strength.

Nature of the Sentiments.—The forms of developed feeling which are called sentiments differ from the emotions largely in *not* having what the latter have. They lack the intensity and the strong bodily tinge (the "somatic reaction") of the emotions. They are more ideal and spiritual, we might say. They are "fuller of ideas;" and some of them are found to be complex forms of feeling that arise only in the presence of "ideals," or constructions of imagination

and thought which the mind holds up to itself as types or patterns of what is not, but ought to be.

Yet here again the distinction between the emotions and the sentiments is not fixed and immovable. Even the artistic and the religious feelings may become so intense and may so stir up in characteristic ways the organs of the body as to become, more properly called, emotions or passions. Some students of nature or of the human mind follow their pursuits with a high degree of mental and bodily disturbance, amounting to an emotional phase of feeling. Moreover, traces of the influence upon feeling itself from the resulting condition of the bodily organs are to be noticed in almost all of the most refined sentiments. Indeed, this fact accords with the very nature of feeling. We shall see how true this is when we consider, for example, the sentiment for the sublime or the sentiment of moral obligation which corresponds to the words, "I ought," or "I ought not."

Classes of Sentiments.—These forms of complex feeling, like all others, do not admit of direct classification. Indirectly, however, and by considering the conditions of their occurrence, or the intellectual processes which accompany them, or the kinds of objects which excite them, they may be divided so as to be treated in a convenient way. Thus three main classes of "sentiments" may be recognized, namely: (1) the intellectual; (2) the æsthetical; and (3) the ethical and religious.

The Intellectual Sentiments.—All the processes of

perception, memory, imagination, and thinking have their peculiar forms of feeling connected with them either as excitants or accompaniments. These "intellectual sentiments" may themselves, therefore, be somewhat roughly divided into two classes. They are such as either serve to give impulse and guidance to the intellectual activities; or else they simply accompany them as *feelings of* the intellectual activities.

Among those of the first class is the sentiment of intellectual curiosity, which, when it is regarded as a motive for doing something, becomes a desire of knowledge "for its own sake," as men are accustomed to say. This sentiment originates in that almost merely animal restlessness to which reference has already been made (p. 178). As imagination operates upon the field of knowledge, it forms an attractive picture of the nobility and the advantages of *merely* knowing; and this picture may be personified, and even worshipped, as a kind of goddess called "Science," with a morbid and sentimental devotion.

In considering the intellectual sentiments of the second class, it should be borne in mind that we actually feel the movements of our own intellectual life, in a variety of forms of feeling which corresponds to the actual variety of these movements. For example, the consciousness of similarity, with its pleased sentiment of recognition, differs from the feeling of the slight or intense shock of surprise which goes with the consciousness of difference.

One *feels* amazed as well as gratified when one apprehends important new truths. In trying to remember, one *feels* puzzled; not quite satisfied unless the remembrance seems absolutely correct, and relieved and gratified when the act of memory seems complete. Indeed, this latter form of feeling is often more of a guide to memory than is judgment or reasoning. Above all in importance is the sentiment of fitness, or approbation, with which "the truth" is greeted by a sound and honest mind. And, indeed, *it is probably feeling, far more and far oftener, than any strict logical conclusiveness in our reasonings that settles for the time being what the truth shall be held to be.*

It could even be shown that, in all probability, every important relation recognized by the intellect and put into language has its appropriate sentiment. Thus there is a feeling, as well as a thought, that goes with all the prepositions, such as "upon," "over," "into," etc. Especially do many of the conjunctions serve to mark peculiar changes in feeling as well as transitions in thought. We all agree with the character in Shakespeare, who did not *like* "But yet."

The Æsthetical Sentiments.—When one is looking at certain objects in nature or in an art gallery, when one is hearing certain successions of sounds at a good concert, when one is reading poetry, or contemplating in memory or imagination a great and heroic deed, one experiences very peculiar feelings of admiration and pleased approval. Such feelings are called "æsthetical sentiments," or the "feel-

ing" of the beautiful. The psychology of these forms of feeling is an exceedingly interesting subject of study; but it has thus far been pursued with only a partial success. Several points may, however, be considered as established.

The æsthetical sentiments are forms of agreeable or disagreeable feeling, as indeed almost (if not quite) all of our sentiments are. But they do not appear to be *merely* agreeable and disagreeable feelings. That is, the satisfaction is not simply sensuous or simply intellectual, as is the satisfaction which is taken in a well-cooked dish or in a sound argument. But æsthetical sentiment may mix in with sensuous feelings; as in the case of the traveller who, on drinking cool, fresh milk in the Pyrenees, "experienced a series of feelings which the word *agreeable* is insufficient to designate." Or, again, as in the case of one of the author's pupils, who testified that the study of Kant's "Critique of Pure Reason" gave him the highest æsthetical enjoyment. There is no way, of course, to prove such statements as these but to appeal to the consciousness of those who make them. And it will be forever useless for small-minded psychologists, with their petty theories of evolution, to try to make the world's artists and admirers of art think that they do not know themselves well enough to understand the difference between genuine *æsthetical sentiments* and *merely agreeable feelings.*

Kinds of the Beautiful.—There are various ways of dividing up the kinds of beautiful objects, and of classifying the arts. But the division in which psy-

chology is interested is based upon the differences in our conscious states when we are contemplating the different sorts of objects which we call "beautiful." Here, of course, the word *beautiful* is used with a very general significance. For example, one form of the beautiful is the *sublime* or the grand. A certain largeness or swelling of feeling is characteristic of our mental attitude before the sublime. This characteristic extends even to the physiological basis of the feeling. One tends to lift up the head, to stretch one's self in stature, to expand the lungs by deep breathing, when one is contemplating the sublime. The intellectual activities are loose and expansive, rather than marked by fixed attention and careful mastery of minute details. Imagination, taking its point of starting from the object, ranges abroad, magnifies known excellences, and even reaches out toward the incomprehensible and the infinite. Feelings of awe and reverence, that seem to have a kind of moral and religious quality, are aroused. Somewhat thus does the sensitive soul feel the sublimity of a storm at sea (when all personal fear and discomfort are absent), or of the clouds and lightning, or the snowy peaks, seen from a mountain's top, or of some heroic charge in a great battle, or an act of religious self-sacrifice.

But if it be the merely *pretty* which one is enjoying, how different is the form of one's æsthetical consciousness? Here there is little or no expansive physiological feeling; attention is concentrated on the harmony or pleasing contrast of details; imagi-

nation seeks little or nothing beyond; and there is almost no excitement of will either to worship or to achieve. So that the merely and excessively pretty often comes very near to exciting feelings of half-contempt. The *graceful*, again, is appreciated only as the thoughts and feelings which accompany easy and pleasant movement, whether of body or of mind, are stirred and gratified. But further remarks on this interesting department of psychology are not fitted to so elementary a work as this.

The Ethical Sentiments.—As has just been seen, some of the æsthetical sentiments are very closely akin to moral and religious sentiments. Especially is this true of the sentiments of awe and reverence, and of the mysterious and infinite, which those objects excite that are called sublime. The various emotions—such as anger, fear, grief, joy, and sympathy—may all become moral or immoral, according to the degree and manner of their prevalence in the life of the mind. Thus natural anger may be cultivated by experience and rational reflection so as to take the form of a holy sentiment against injustice, such as is rightly attributed even to God himself. Fear may be developed into the sentiment of reverence for what is true, beautiful, and good. To be false or to speak lies becomes for some men the most to be dreaded of all things conceivable. "The fear of God," we are told, "is the beginning of wisdom." Crude animal sympathy is also developed into the refined sentiment of unselfish love for others, love of friends, love of country, love of humanity.

There are, however, certain sentiments, or forms of feeling, developed, in the course of the natural life of the mind, that are *distinctly ethical.* It is the possession of these which seems to make man a moral being, on the side of feeling, as none of the lower animals are. Among these we note, first, *the sentiment of moral obligation*, or the feeling which is expressed by the words "I ought," "he ought," etc. Begging pardon for the expression, we will call this the "feeling of oughtness." This is a perfectly unique sentiment, is not like any other, and cannot be understood as a development or modification of any other. Its unique character is undoubted, however the sentiment may seem to have arisen. So far as is known, the lower animals have no corresponding form of consciousness. Second: the *sentiment of moral approbation or disapprobation* seems also to be a distinctive and unique ethical sentiment. The words "approve" and "disapprove" are indeed used with a variety of meanings. The animals—as, for example, a dog that has failed to retrieve or that has been caught stealing a bit of meat—show certain signs of shame for what they have done or have failed to do. A defeated foot-ball team, even when it has "done its duty," may have a similar feeling of shame. But that distinctively moral feeling which arises when, in spite, it may be, of threatened pain and loss, one has done what sound judgment decides ought to be done, is apparently the possession of man alone.

Nature of Conscience.—Few words are used with

more indefiniteness and variety of meaning than the word "conscience." In none of its meanings, however, can the claim to regard conscience as a special faculty of the mind be made good. If the word be employed to comprehend the judgments of men as to what is right and what is wrong in character or conduct, then conscience is certainly no special faculty. Judgment about matters of right and wrong, *as judgment*, is precisely similar to judgment about all other matters. In all matters men take some of their judgments from others, quite unthinkingly; other judgments they make up after more or less reflection; still others they grasp at, as it were, in a way to hit right, perhaps, but so that they cannot justify to reason the conclusion, either before their own intellect or the intellect of other men. In all matters judgment springs very largely out of blind feeling.

It has already been seen that most of the so-called ethical sentiments (conscience as feeling) are not originally ethical, in the stricter sense of the word. But two forms at least—the feeling of moral obligation and the feeling of moral approbation—are distinctive and unique. How these feelings come to be attached to certain particular forms of conduct, how it is that you feel that "you ought," and I feel that "I ought," in such very different ways, is a matter of education, personal history, etc. But both you and I and all men agree in having certain distinctively human and moral sentiments aroused; we agree also in having these sentiments so largely at-

tached to the same courses of conduct or to the same deeds, because there is so much in common, not only in human nature, but also in the circumstances and teachings under which it was developed.

Hence it comes about that *from the point of view of individual consciousness, the "ought-feeling" and the feeling of moral approbation are generally attached, without any conscious process of reasoning, to a so-called moral judgment; but in making up the judgment any amount of reasoning is admissible, for it is a matter of evidence more or less.*

Nature of the Desires.—Those states of consciousness which we have called "the desires" lie nearer to the will than do the emotions and sentiments, considered merely as such. Indeed, in order to understand the origin and nature of the desires, it is necessary to take our point of starting chiefly from "the impulses." Here we may begin by noticing that the various forms of natural emotion have their characteristic impulses toward certain forms of movement. For example, the impulse of the angry child is to strike or kick; or to bite some object; or, in case fear restrains from this, to beat his heels or his head on the floor. The impulse of love is to fondle, to defend, to embrace. Feelings like those of curiosity, expectation, and doubt also act as impulses. The impulse of the curious mind is to look "pryingly," and that of the doubtful mind to look "suspiciously." But plainly each of these impulses involves acts of will, the doing of something that has its end in the gratification or relief of feeling.

Genuine desires, however, as distinguished from impulses, require a considerable development of intellect, an acquirement of experience as to the results of what is done and of the ways to reach the ends toward which feeling impels the mind. Some end of which we have a mental picture, and about the effects of which upon our well-being we have knowledge acquired in the past, must be the object of desire. Desires, therefore, involve the development and use of all the faculties of mind in a rather complicated way. It is the *stress of feeling ready to break over*—as it were—*into a definite act of will toward some particular end, which is the peculiar characteristic of the desires.*

Kinds of Desires.—It is as difficult to classify the desires satisfactorily as it is to classify the sentiments. For purposes of convenience, however, four classes of desires may be distinguished: (1) Sensuous, or those which arise out of bodily cravings, and find their satisfaction in the possession and use of some object; (2) Intellectual desires, or those cravings that arise from the mental faculties and find their satisfaction in mental exercises, or states, regarded as objects or ends to be gained; (3) Sentimental desires, or those which arise in the contemplation of some form of the beautiful or of the morally good in conduct and character; and (4) Pathological, where things which seem repulsive, and the possession and use of which are painful to the person himself, are still desired in a sort of diseased and irrational way.

It has already been noticed that desires, as compared with all other states of consciousness, stand closest to the act of will. It is usually only a step from "I want very badly" to "I will have." "I want;" "I will to have;" "I strive to get;"—these follow each other in this order, unless "self-control" intervenes. It is to the nature of willing, then, as to the highest and most complex activity of mind, that attention is now directed.

CHAPTER XII

WILL AND CHARACTER

It has been seen (p. 14f.) that all states of consciousness may be regarded as having an *active* side or aspect; that one must consider one's self as always *doing* something, as well as thinking about somewhat and feeling somehow. This active aspect of the self, this always doing something which we detect in all our conscious states, needs a name for it as a most general form of mental life. To "will," in any proper sense of the word, involves all the faculties of intellect and of feeling; willing and choosing are, therefore, terms too complex to signify the most simple and elementary form of active experience. The word *conation* has been suggested for this purpose, and has been employed by several writers on psychology.

Nature of Conation.—Inquiry into the characteristics of this fundamental aspect of all mental life, for which the word "conation" has just been selected, reveals little or nothing to be said. We cannot define what it is to be active or to do; for there are no simpler terms than these same words—"to be active" and "to do"—by which to describe such experience. This is not especially strange; for it is equally true that one cannot define what it is to

have a sensation, or what it is to feel, whether a pleasure or a pain, etc. It is possible, however, to describe in some sort the different kinds of sensation and the different kinds of feeling. But there seems to be only one kind of conation. A great variety of effects in the way of bodily movements and of different directions given to the mental train follows, indeed, from the different acts of conation. But the character of all conation, as such, seems to be alike.

Two classes of effects, however, are uniformly connected with conation considered as the very simplest and most elementary mental activity. These are (1) movements of the bodily members, so far as our mental doing affects them directly; and (2) the determination of the direction and amount of attention —the fixing and distribution of mental energy in the so-called field of consciousness (compare p. 23f.). Thus it is that when we conceive of ourselves as "doing something," it is always either in the way of moving some of the bodily members so as to accomplish a certain end, or else in the way of voluntarily controlling the ideas, thoughts, feelings, and other forms of mental life. These two classes of effects are connected with the phenomena of choosing, planning, and all the higher forms of the manifestation of will.

In general it may be said that *all mental life manifests itself to the subject of that life as being, in one of its fundamental aspects, its own spontaneous activity.*

Conditions of Conation.—The physiological conditions of that self-doing, or active aspect of mental

life, which has been called conation, are very obscure. So far as they can be discovered, they belong to what has been called the "automatism" of the central nervous system. Every minute animal, like an amœba, for example, exhibits this peculiar power; some of the changes of form or position which it goes through seem to originate from within rather than from any kind of external stimulation which can be detected. Thus, if one watches an amœba under the microscope, one may sometimes see it pushing out its border here and drawing it in there, for reasons that seem to have nothing to do with the action upon its surfaces of the fluid in which it is placed.

As the complexity of the animal structure increases, the central organs of the nervous system take on themselves, to the highest degree, this power of "automatic" (or seemingly self-originating) action. In man's case it is the brain, and especially the higher regions of the brain, that rule over the lower organs, in part by the possession of this power. If we sever the spinal cord of a frog from its brain, then the cord alone will move the limbs in various purposeful ways under the action of the electrical current. If some of the lower parts of the brain are also left attached to the cord, then this piece of nervous mechanism will jump; it will also croak, when stroked, with the regularity of a music-box. But the full-brained frog will only leap or croak, *if it wills;* it cannot be depended upon for the same kind of regularity as the brainless frog.

Kinds of Movement.—In understanding the origin of the various movements of the body and its members, one principle is of chief importance. *Every kind of excitement in the brain—whether connected with sensations, emotions, or ideas—tends to "overflow" the centres and areas in which it originates, and to flow down the nerve-tracts to the muscles and other connected organs; and thus to set in movement the different connected parts of the external motor apparatus.*

Under this one general principle a variety of kinds of movement arise, which, so far as they originate in conscious states, may be divided as follows: (1) *Random* movements, such as new-born infants make, and which seem to originate chiefly in "conation" as a blind action of will, without any conscious end to be reached. In this way infants are constantly striking and kicking, with a perfect indifference as to what—even their own sensitive parts—they hit in their blind efforts. (2) *Sensory-motor* movements are those which arise chiefly in the excitement of some form of sensation. Thus every smell naturally stirs us up to sniff in the air, every taste provokes the tongue to motion; and a moving object or bright light, in any direction, causes an almost irresistible tendency to turn the head. (3) *Æsthetico-motor* is a term that might be used for those movements which originate chiefly in the feelings as having a tone of pleasure or of pain. But (4) various *impulsive* and *instinctive* movements arise which involve a low amount, at least, of feeling and of the idea of some end to be reached, but which are not of a strictly vol-

untary or thoughtful character. Where these belong to the human species, and are developed upon a basis of inherited characteristics, and tend to preserve the life and the interests of the species, they may be called "instinctive."

(5) *Ideo-motor* movements are those that are excited by ideas arising in consciousness. In all our waking states, if the idea of doing anything in particular is suggested to the mind, unless some check is furnished, the tendency at once arises to carry the idea out in the appropriate form of movement. Thus in various sports, or other complicated forms of muscular activity, in connection with trained habits of bodily movement, every idea is quickly followed by some corresponding deed. Very interesting also are (6) the *imitative* movements which occur so early in the life of the infant. One observer, for example, tells how a child of only fifteen weeks old was seen trying to "purse up" his lips when this was done by some one else "close in front of him." And, finally, there are (7) *voluntary* movements, where *we*, with a fuller consciousness of what we wish to do, *will* that the movements shall occur (sometimes after no little deliberation, and sometimes in spite of certain strong considerations to the contrary, and with much feeling of effort).

It should be borne in mind, however, that all these various kinds of movement are, as a matter of fact, more or less mingled together. Perfectly "pure" cases of either kind occur only, for the most part, in early life. For example, the same imitative move-

ments which are seen in infants, when performed by adults, are apt also to have behind them much of sympathetic ideas and feelings to account, in part, for their origin.

Nature of Volition.—Those so-called "blind acts of will," or "mere conations," which account for many of the movements already described, become more and more displaced by acts of will that show intelligence and foresight. Such an act of will may then be called a "volition." A volition thus implies a certain development of will, and not of will alone (as though this were possible), but of all the connected conscious powers of the mind. It may be defined as a definite conation (or conscious doing) directed toward realizing some end that is pictured before the mind, preceded or accompanied by a condition of desire, and usually accompanied or followed by a feeling of effort.

All the different elements which enter into a volition may vary somewhat indefinitely. For example, the mental picture of the end to be willed may be more or less definite; and it may itself be held by an act of will for a longer or shorter time before the mind. More or less clearly, however, *every volition is an act of will which knows what it wants.* The period and the stress of desire may also vary greatly in different volitions. Sometimes one wills a certain thing very coolly, and sometimes as springing from very warm wishes or intense wants.

Nature of Deliberation.—One very peculiar and interesting feature varies greatly with different acts of

will. This is the amount of what is called "deliberation." But deliberation is itself a mixture of intellect and will. For when one deliberates, one thinks over the consequences which past experience teaches are likely to follow from one's action; and meantime one holds the decision in suspense, as it were. This very "holding in suspense" is itself, however, a volition; or, rather, it is often a series of volitions that all have what is sometimes called an "inhibitory" character. Different persons habitually differ to no small degree in respect to the amount of deliberation which precedes their volitions. Hence we hear of reckless will, hasty will, excited will, cool will, reluctant will, etc. Hence, also, *the will to deliberate* is itself a very important and influential form of will. Strong and reasonable will depends largely upon the character and issue of the deliberation which precedes the decision. Weakness of will may consist in "getting stuck fast" in one's feelings and emotions, and so deliberating indefinitely without any power to decide "for one's self." In this connection, too, it may be noted that *the will determines the ideas, feelings, and desires just as truly as they influence the will.*

Resolution of Deliberation.—The period of so-called deliberation must, of course, at some time come to an end. Its issue may be reached in any one of several different ways. Sometimes the volition seems to be the mere result of exhaustion; we feel that we cannot keep on deliberating any longer—we must do something, and the volition takes the

line of least resistance at that very moment. We will to "let go," to "yield up," to "cease to try" finding out by deliberation what it is best to will. Sometimes, on the contrary, all our powers seem suddenly to rally and to break over the barriers; then all at once we find, to our relief and joy, that we have already willed what only a short time ago seemed so impossible to us.

Faculties Employed in Will.—Much confusion has been introduced into psychology by speaking as though "the will" were a sort of separate faculty that could be considered apart from the rest of mental life. On the contrary, some have insisted that it should be regarded as merely the expression of the stronger sensations, feelings, or desires. These states have been regarded as "*motives*" which, by a sort of strength inherent in them and independent of our control, determine the will. Still other writers have seemed to hold that the will can be raised to a sort of god-like independence of all the other faculties, and so can bend them to itself. The fact is that what is ordinarily called "willing" is an exceedingly complex affair, and involves no little development of all the faculties of the mind. In the higher sense of the words "to will," no one can will without employing intellect, memory, imagination, and thought—without setting before the conscious Self the particular end to be willed, or without the feeling being aroused to some extent in view of this pictured end. But it does not follow from this that what we indicate by "I will" is not a unique sort of thing in

the conscious life. On the contrary, it is plainly a different kind of phenomenon in consciousness from what is indicated by any terms which apply to the merely intellectual and emotional life. *What we will is not only dependent upon what we think and what we wish, but also what we think on what we wish and will.* And that willing determines largely our feelings and desires has already been said.

Nature of Choice.—The highest expression of will is reached when a choice is made. In order that all the mental factors which enter into a "mature" choice may be understood, it is necessary to separate in thought what is often very closely "huddled together" in the actual life of the mind. In such a choice the following factors may be recognized: There is (1) the mental representation, or picturing before the mind, of two or more ends which are regarded as dependent upon our action, and, generally, also of the means which will be necessary to realize these ends. (2) This is accompanied by some excitement of the feelings—the emotions, sentiments, and desires—as the "good" of these ends is considered by the mind. And since such processes of mental representation and feeling cannot all occur together in the conscious life, there is (3) deliberation, which involves some estimating of the relative value of the two or more ends, of the risks and pains or pleasures connected with their attainment; and perhaps a sort of conflict of desires. Then, somehow, there follows (4) decision, or that adoption of an end as *mine* which corresponds to the words "*I* will." And, finally, in

case something is to be done about it, there is the "letting go," or the "gripping on" of attention, to move the muscular apparatus and to conduct the train of thoughts and ideas. It is, however, in No. 4, *in decision, or the "cutting short" of the process of deliberation by adoption of one of the several ends to be "mine," that the will expresses itself as the faculty distinctive in all making of choices.*

Formation of Plans and Purposes.—Properly speaking, every volition, and especially every choice, is planful or purposeful. Suppose, for example, that the pitcher of a base-ball wills to pitch it with the only one curve which he can make effective; or he chooses, of two or three of his curves, the particular one which he thinks hardest for that particular batter to hit. He accordingly uses his eyes and his muscles in a planful way—in a manner that is to carry out the purpose he has formed. His choice *is* the adoption of a plan. The same thing is true when I take a peach instead of an apple, to eat, from a plate of fruit; or when I make up my mind to walk down street rather than to run for the street-car to the next corner.

Indeed, all our waking life we are constantly forming and executing—generally with a fair measure of success—a series of plans. The only thing for us, if we do not do this, is to "go it wild," and get no benefit from past experience. Indeed, it might with much truth be said that one cannot avoid acting in a planful way; for many of these plans are bedded into the nervous and muscular

organism and into all the habits of thought and feeling; so that it would be far more trouble to avoid following them than to adopt them.

Execution of Plans and Purposes.—Different plans differ in the relations which they sustain to the will, with respect to their being "carried out," almost immeasurably. Some of them, as has just been indicated, are no sooner framed than they proceed to carry themselves out in an almost purely impulsive way; or by laying hold, as it were, on past habits of conduct. Thus it would be with a savage's plan to hit a particular one of the enemy with his poisoned arrow. Others have to be "backed up" through days and even years of waiting and working by continually repeated action of the will. Such are the plans, more or less intelligently adopted, which steady life and give it some sort of unity and dignity; without which, indeed, life is carried and driven in contradictory directions by impulse and caprice, and so is made more animal than really human. Without such plans, no matter how choice and refined some of the sentiments may seem to be, there is no best living possible, and no really worthy character to be attained. Here again we see how *will* enters into all our experience; instead of being merely the dependent result of the emotions, sentiments, and desires, it rather also shapes and gives character to the emotions, sentiments, and desires. To have some relatively low and unworthy plan in living is, indeed, better than to have all our consciousness and conduct ruled by impulse and ca-

price. There is always a certain dignity belonging to one who can declare, with a character of Browning's:

"I have subdued my life to the one purpose
Whereto I ordained it;"

or, again:

"I have made my life consist of one idea."

Freedom of Will.—It by no means belongs to the science of psychology thoroughly to discuss the question whether the will is free or not. The thorough discussion of this question belongs to philosophy, and is connected with a number of the most abstruse philosophical problems. But without doubt the whole problem of "free will" arises in certain conscious states, which psychology must take account of, since this science describes and, as far as possible, explains all states of consciousness, as such.

Certain peculiar states, when looked at from the point of view of the "*I will*" that is in them, may be called the "consciousness of freedom." In such states the following particulars are to be noticed: (1) In willing, in the highest form of deliberate choice or planning, the consciousness of self-activity is most pronounced. Such deeds of will I regard as, in a peculiar sense of the words, "*my own*." I can, in some sort, deny or reject my emotions and desires as having surprised and overcome me; the stronger they are, the more passive *I* appear before them. So, too, the clearer and more complete my

ideas and thoughts become, the more do they seem to have the character which fits them to be considered as thoughts necessary to others also. But it is *I*, and *I alone, that will;* and on my deliberate choices and plans my *Self* stamps itself with a peculiar signature.

(2) That consciousness which is fitly expressed by such words as "I can" accompanies all genuine deeds of will, in their highest form. When I stand before the choice and contemplate it as about to be made, my conviction with reference to it is irresistible: "*I know I can.*" And when I stand and look behind upon the choice as already made, and feel moral approbation or moral shame, I have the conviction "I could have not," although I did; or "I could have," although I did not. The conviction of ability, or power in choosing is a part of the "consciousness of freedom;" and about its existence and immense significance there can be no manner of doubt. (3) The two preceding phases of consciousness may go with every form of mental life. Thus I may *freely* remember, freely imagine, freely think, freely feel either joy or suffering, love or hate, and every form of sentiment from bodily fear to reverence for God. For, to a certain extent, Will may enter into them all and make them *my own*—manifestations of my power of *self-control.* In connection with such conscious states arise (4) the thought and feeling of "imputability" or "responsibility." And here the ethical sentiments, to which reference has already been made, come strongly

into play. Since I "impute" the deed of will to myself, feel that *I*, and *I only*, am "responsible" for it, my moral self-approbation or disapprobation seems to me "reasonable;" whereas, otherwise, it would not.

It is interesting to notice that all attempts, made by those who deny the freedom of the will, to break the force of these undoubted facts of consciousness, really have no meaning themselves unless we admit the force of the facts. It is sometimes argued as though ignorance of the motives which determine the will were the source of the conviction, "I can," or "I could." But, on the contrary, no argument would ever arise *as to how* this conviction were caused, were it not for the positive and unique character of the conviction itself. To try to explain the consciousness "I can" by ignorance as to why "I do" is simply absurd. Dogs do not think of themselves as *not* free; because the whole consciousness out of which the conception arises of being free and not being free is quite foreign to them. So, too, whenever we "excuse" ourselves for some form of conduct because of the suddenness of our emotion or the stress of our desires, the very excuse is meaningless unless we admit the consciousness of freedom as something with which this experience is partly, or wholly, in contrast.

The Conception of Character.—The word "character" is very frequently used in both a wider and also a narrower meaning. Sometimes it stands for the sum-total of all the peculiarities belonging to an in-

dividual, including all that comes — more strictly speaking—under "disposition," "temperament," etc., as well as the habits formed by exercise of self-control. But, in the narrower and more precise meaning of the word, character may be defined as being the *self-formed habits of will.* It is the "stamp" that we give to ourselves by habitually choosing and holding fast to certain ends. Of course, it is practically impossible to separate wholly between a person's "nature" or "natural disposition," as we say, and the same person's "character." For from the very first, and more and more as the acquiring of experience and the development of mental life goes on, this natural disposition is moulded, not only by circumstances, but also by the way in which *we* take, seize, appropriate, and use the circumstances by responsive choices, plans, and, in general, deeds of will. All the while, then, we are both "being stamped," and "stamping" ourselves; and *the* stamp of character which results is, therefore, due to a ceaseless mixture of the two.

Development of Character.—It is plainly impossible to live and to avoid the formation of character. As we shall see in the next chapter, the great ruling principles under which all mental life falls tend constantly to settle and solidify the whole. Even unreasoning caprice and impulse, constantly indulged in, work themselves into the structure of character. And so we come to use that strange and yet most impressive term, a "capricious character" —a "stamped" form of the individual mental life,

that bears *the* stamp of being (contrary to the very conception of a "stamp") not settled or fixed or to be depended upon in any particular. Yet this is really not inconsistent with the old Stoic conception, that settled character is "always to *will* the same and *nil* the same;" or the other saying, that "character is a habit of doing, not which *has* the Self, but which the Self *is*." *For the development of mental life into some fixed and settled form of character necessarily results from the continued existence of this life. We cannot live without acquiring character.*

CHAPTER XIII

TEMPERAMENT AND DEVELOPMENT

CHILDREN sometimes amuse themselves in the vain effort to find two individual things which are precisely alike; such as, for example, two blades of striped grass or two leaves of clover. But no two precisely similar individuals in nature are ever to be found. And what is true of such comparatively insignificant natural objects is even more true of the bodies of individual men. Strangers frequently have great difficulty in telling twins apart, and the members of other races are apt to seem to travellers in foreign countries much more nearly alike than are the members of their own race. But, certainly, two adult human bodies never existed in which careful observation would not reveal many differences. What is true of the developed human body is also true of the human mind. Every "stream of consciousness" runs its own course; and the character of the individual states which compose the stream, as well as the order of their succession, differs from the character and order of every other. No two minds ever developed precisely alike.

While all this is true, however, it is also true that some individuals are in mental disposition and character much *more* alike than are individuals taken at

random from the whole community. To say the same thing in another way, individual minds may be grouped together into classes, so that those well within each class are more alike than are those belonging to any two different classes. And the basis of the classification may be differently chosen; it may be age, or sex, or what we are accustomed to call "temperament."

Doctrine of Temperament.—*By a temperament we understand any marked type of mental constitution and development which seems due to inherited characteristics of the bodily organism.* The doctrine of temperaments is very old indeed, very vague, in spite of all efforts to render it definite and scientific, and yet very firmly fixed, not only in the popular belief, but also in the opinion of competent observers. There are certain somewhat plainly marked types of minds. In the speed and sensitiveness of mental reaction to sensory stimulus; in the speed and completeness with which the ideas are reproduced, and in the rapidity of their combination as well as the manner in which they tend to combine; in insight into situations and quickness of decision; in various forms of artistic, moral, and religious susceptibility—different individuals vary greatly. Such variation cannot all be accounted for as due to circumstances or to education. Some of it plainly belongs to what comes over from the parentage and belongs to the child at the beginning; that is, some of it is hereditary. That part of it which is hereditary must of course depend upon the character of that which is actually in-

herited; and this is the constitution of the bodily organism.

In understanding the doctrine of temperaments, however, it should be remembered that perfectly plain and pure "types" corresponding to any particular temperament are comparatively rare. Most individuals are "mixtures" of different types. It may also be explained that age, sex, and acquired character so blend with temperament as to make the whole matter more complicated. A "sentimental" woman differs from a sentimental man; a "choleric" child from a choleric man; and a "phlegmatic" good man may scarcely seem at all like a phlegmatic criminal. Different races, too, while they comprise, each one, all the temperaments, may have a sort of predominating temperament belonging to the race. The Japanese people, for example, are undoubtedly of a prevailing sentimental temperament.

Kinds of Temperament.—Curiously enough, with all the difference of view about temperaments, *four* kinds have been pretty generally recognized. Of these the three most clearly established are the sanguine, the choleric, and the phlegmatic. There is still another kind of temperament, the characteristics of which are not quite so clearly marked and for which different names have been chosen. We shall call it by the term which Lotze gave to it; and we have already spoken of it as the "sentimental temperament." A largely similar type of mental constitution has sometimes been called the "melancholic temperament;" but this name is less fitting.

A man or woman of a marked *sanguine* temperament is subject to lively and varied excitability and rapid change; but, in general, without much depth or stability. This is the temperament of childhood and of childish men and women. It has many but short-lived friendships, quick but easily disappointed hopes and other forms of emotion. The ideas and thoughts run and sparkle and change; but are not so apt to be bedded in well-considered reasons or adopted by the action of a steadfast will. The *choleric* person may be less quick and varied in reactions; but the reactions are more enduring, passionate, and determined, and the conduct as well as the states of consciousness less subject to change. This is the *man's* temperament: the one that belongs to strength and to middle life and to the successful in life's hardest battles. The *phlegmatic* temperament is comparatively sluggish in mental changes and bodily movements; it is the opposite of lively and versatile, although it may be either tenacious or weak in respect of will.

We have all also noticed certain persons who are perhaps among the most interesting, who are lively in imagination, susceptible to very delicate impressions of sense and to every form of feeling. But they are moody in feeling, indifferent to present practical issues, and uncertain in conduct. They get stuck fast in their own sentiments and cannot act; or else they act impulsively, and then suffer a collapse of will. They have the poetic or artistic—the so-called *sentimental*—temperament. But with-

out a mixture of some other form of temperament, or without very favorable circumstances and associations to stimulate and support them, they seldom accomplish much in poetry or in any form of art; while in practical affairs they are likely to be quite unsuccessful.

Basis of Temperament.—The words used for the different main temperaments show what was formerly thought as to the physical causes of the temperaments. Thus the "choleric" temperament was supposed to be due to excess of "bile," the "sanguine" to fulness of "blood," the "phlegmatic" to a large amount of "phlegm," and the "melancholic" to "black bile." We know now that these particular views are whimsical and quite without warrant, but we do not know what are the precise characteristics of the constitution of the body in which the causes for these differences of temperament are really to be found. The sensitiveness to stimulus of the different organs of sense, the composition of the blood, the character of the processes of digestion and secretion, etc., are probably among the principal of these bodily causes.

Difference of the Sexes.—The doctrine of the differences which exist between males and females of the human species, so far as any such doctrine can be formed, is very similar to that of the temperaments. Here, too, it is quite impossible in many cases to tell how much is, strictly speaking, natural and unchangeable; how much is due to social habits and changeable products of civilization.

Moreover, the whole question is just now being discussed with such an amount of heat and prejudice that the scientific spirit is difficult indeed to find among the disputants.

The physical differences of the average male and female, at the various ages of life, have been somewhat carefully measured in a large number of instances. They show that the curve which indicates the growth of the two differs, and that the relative proportion of the different members of the body is not the same. The length of the arms and legs, for example, in the male is greater; the centre of gravity is higher, the step is longer. In the nervous and muscular systems there are even more marked differences. The average weight of the brain of the adult male is to that of the female as about 1.424 to 1.272. There appears also to be a difference in the very earliest development of the convolutions of the cerebral hemispheres, and of the balance of the parts—the growth of the male's brain in front of the central fissure being proportionately greater. The pulse of the female is quicker; the blood is less in quantity, of lighter specific gravity, and contains fewer red corpuscles. She is more inclined to spasmodic and cramping action of the muscles, to sudden and incalculable secretions, to wide-spreading and somewhat chaotic excitements of the nervous system.

There is just as little doubt that mental—and more particularly emotional—differences correspond to the physical differences which have just been pointed

out. This may almost be said to follow as a matter of course when we consider that the muscles are the organ of will; that the bodily feelings enter so largely into our very consciousness of Self; that discrimination, judgment, and all the more elaborate processes of thought are so inevitably influenced by the emotions and practical activities; and that the points of view and the feelings peculiar to sex enter into and influence the entire social and even the moral and religious life.

Effect of Age and Race.—It has already been said (p. 214), that the influence of temperament is modified by the age of the individual and that, conversely, each age has a sort of temperament peculiar to it. Thus the sanguine and sentimental temperaments belong to childhood and youth, the choleric to middle life—especially to manhood—and the phlegmatic to old age. In the development of mental life, the acquirement of a use of the senses, and of the knowledge which comes more immediately through them, is first in order. But these, as there has been abundant reason to recognize (compare pp. 142ff.), involve a certain amount of discrimination, of judgment, and even of making quick and almost instinctive inferences. Certain primary forms of feeling also accompany the earliest use of the senses and of the intellect in gaining an acquaintance with the infant's own body and with surrounding things. Meanwhile will is being constantly aroused and developed in the direction of attention for the control of the muscular apparatus and of the "field of consciousness."

It is highly probable that the start and first growth of human mental life, as a matter of sensations chiefly, come before the birth of the infant. Sensations of pressure, of motion, and of temperature may very likely arise at this period. With infants born prematurely there is evidence to show that they taste sugar or quinine when it is put into the mouth, and that certain odors produce agreeable or disagreeable sensations. All newly born children are deaf, because of a mass of tissue which fills the middle ear. The eyes of the infant very early begin to move in an associated and coördinated way; although probably not until several days after birth, in most cases. The skin has at first little or no perceptive power, and the muscles are undeveloped; but the brain and the organs of sense appear to be far in advance of the mental development which would seem to be needed to correspond.

The psychology of the different races of men ("ethnic psychology") is an exceedingly interesting field of research. It will have, however, to be cultivated more by trained psychologists rather than by mere biologists, in order to yield any fruits of much value. On the other hand, the student already familiar with general psychology, as studied in the modern method, finds in the examination of the consciousness of men of different races a large amount of illustrative material that is instructive. What is called "anthropology," as studied without this careful preparation of acquaintance with modern scientific psychology, is of little value in throwing light

on the real development of man's mental life. It is rather a miscellaneous collection of statistics and antiquarian relics, from which few or no principles can safely be derived.

General Principles of Mental Life.—We certainly cannot talk of known "laws" controlling the action and life of the mind, as the "law of gravity" controls the behavior of masses of matter toward each other in space, or the "law of equivalency" controls the chemical union of the atoms of the different material elements known to modern chemistry. All pretence of such knowledge in psychology *is mere pretence;* and if *such* knowledge is necessary, in order to a "science" of the mental life, then no science of psychology exists. For ourselves, we are quite willing to go further, and to affirm that no such laws will ever be discovered; and that no science of mind comparable to mathematical astronomy or to mathematical chemistry will ever exist. This we believe to be true for the very good reason that we cannot speak correctly of "laws controlling" in the realm of mind with the same meaning which we are warranted in applying to the term when speaking of material masses and atoms. The discussion of this question, however, would take us quite beyond our present purpose, over into the fields of philosophy.

Certain general principles of all mental life may, however, be announced in the sense that all the action and growth of the so-called faculties suggests and confirms generalizations which have to do with all men — vague types of behavior, to which the

mental life of every individual conforms, because it is indeed a *human* mental life. If it were our intention to enter upon this subject thoroughly, it would be necessary to point out what these universal forms of behavior are, and how they may be recognized and proved as actually belonging to the life of the mind. And here the question might be discussed: what is meant by saying, for example, that all *things* exist in "space" and in "time;" but that space is not to be affirmed of the existence of *mind;* while time most certainly belongs, in the forms of "duration" and "succession," to all mental life. Then the question might also be raised as to the origin and nature of what is customarily called "casual influence"—whence is got the conception of cause, and what the word "cause" really means. Still further, if the activity of the intellect in reasoning were searched to the bottom, then the effort might be made to know more about the origin and meaning of the "principle of sufficient reason" (already spoken of), and of the "principle of identity;" and, possibly, also of the fundamental logical principles.

To perform this work, however, we shall not attempt. Our very brief surface explorations in the region of mental phenomena will be concluded by calling attention to the following four principles which must be recognized as present in all the development of mind.

The Principle of Continuity.—A review of what has been seen to be true at every stage of our investi-

gation shows that, *when the mental life is regarded as a whole, no breaks or sudden leaps are found, whether as between its faculties or their elements; or as between the successive different states and stages of its development.* To say this is almost the same thing as to say that the mental life is a true "development." For some kind of pretty strict "continuity" is necessary to all development; although in organic growth, as in the growth of the mind, certain epochs and periods of marked and relatively sudden change are to be observed. The principle of continuity applies, however, to the mind with peculiar force. Because what are called "elements," "faculties," "states," "stages," etc., have no existence whatever apart from that continuously flowing life-movement, whose subject is called "the Mind."

To illustrate this principle, one might refer to nearly everything which has thus far been said regarding the mental activities. For example, it was found that the almost infinite variety of sensations belonging to some of the senses—such as colors, sensations of musical sound, of temperature, and of pressure—can be arranged in continuous series or scales where shades of quality and degrees of intensity merge into each other. The so-called sensations are, in all actual experience, "woven together" into a sort of continuous texture. This is true, for instance, of tastes and smells, of sensations of touch and muscular sensations, and even of sensations of color and muscular sensations. The same principle applies to the so-called faculties;

for many sensations cannot be distinguished from mental images or ideas; and among ideas those which belong to memory and those which belong to imagination often cannot be distinguished. Just where mental images become conceptions and where the lines are drawn between the recognition of perception and true acts of reasoning cannot easily be discerned. And although we cannot shade into each other, by a continuous gradation, the different activities belonging to the three faculties of intellect, feeling, and will, we do find that they are always continuously joined and blended; and that it is by no means easy always to know to which of these three faculties certain particular states of consciousness should be assigned.

Principle of Relativity.—This principle is very closely connected with the principle of continuity. No element, or state, or faculty of the mental life can be considered, in a way to correspond to the facts and to the reality of that life, without taking other elements, states, and faculties into the account. Or, *every individual element, or state, or form of mental life is what it is only as relative to other elements, states, and forms of mental life.* This principle, too, admits of almost indefinite illustration. Sensations, for example, have no absolute quality or amount, independent of the preceding expectation, of the conditions of attention under which they arise in consciousness, and of the quality and amount of preceding and simultaneous sensations of the same sense or of other senses. A most curious illustration of the

force of this principle was obtained in the experiments to which reference has already been made (p. 146). No one, child or adult, was able to *feel* the weight of a certain small cylinder to be equal to a certain larger cylinder, although the two *were* exactly the same. In many instances the former was felt to be twice (or even more) as heavy as the latter; the reason plainly being that the feeling of the weight was *relative* to the influence of expectation first induced by sight, and then so corrected by experience as to throw the judgment over to the other extreme.

The Principle of Solidarity.—The development of the mental life tends, in a very unique and impressive way, toward a sort of consolidation, or self-organizing, as it were. For it is a principle of this life, that *every activity, whether partial or more general, influences the entire development; and that thus this development tends toward some unification of result.* Here it is that the formation of habits becomes of such immense importance. The principle of habit belongs both to body and to mind; it also belongs to every organ, and even to every tissue of the body, and to every faculty of the mind. Especially are the nervous system and the brain brought under the influence of this principle. A person with a sensitive brain can scarcely wake up two nights in succession at the same hour without finding a tendency developing to wake again and again at the same hour. Let a man be lamed for some time so that he cannot without pain bring his foot down squarely when ascending a pair of stairs, and the chances are that the

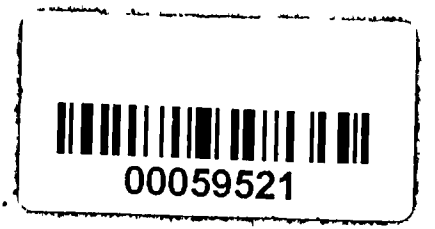
habitual swing of that leg in ascending a pair of stairs will remain changed during the remainder of his life.

In infancy and youth both body and mind are relatively very impressible and susceptible to the formation of new habits. This fact is connected with the entire character of the tissues and of their rate of repair and destruction. But with advancing age an actual physical consolidation takes place. The tissues become less mouldable, less impressible to new influences, etc. Something similar is undoubtedly a principle of the mental life. In those persons also where susceptibility to change, caprice, and perversity of thought, of feeling, and of conduct rule most, the principle still holds. Here, too, the very capriciousness, the action that is without recognized rational motive and intelligent control of the will, "solidifies itself." For every mind's life *must* tend toward some kind of unity; and this is what was seen to be true when the formation of character was discussed (p. 208f.).

Principle of Final Purpose.—Finally, *activity to some purpose, or end, is a principle of mental development.* In the bodily structure and development the principle of final purpose is recognizable throughout. The behavior of the spinal cord of a frog, when it has been severed from the brain, illustrates this principle. And although the newly born infant puts forth many movements which appear, at first sight, to serve no purpose ("random automatic movements"), still a profounder view shows how even

these serve the end of giving it the intelligent mastery of its own mechanism for the subsequent attainment of ends consciously recognized and adopted. But this principle is no less powerful and universal in the development of the mind. On the occurrence of every sensation the tendency is to put the motor apparatus to working in a manner directed to some appropriate end. Ideas have a sort of structure, so to speak, and thereby serve the purposes of being guides to thought and conduct, as the sensations from which they originate could not possibly be. Every process of reasoning is a movement of the stream of consciousness in a direction toward some end. The concluding judgment is "drawn" on "account of" some other judgment, and so as itself to serve for a guide to conduct or to some still further process of reasoning.

This principle works, as do indeed all the other principles of mental life, largely below the consciousness, as it were. The work is much of it—so it would seem—done *for* us rather than *by* us with an intelligent and conscious adoption of the end to be reached. But the true and higher development is attained only as matters are more thoroughly put into our own hands. He who knows himself, who plans his own life, who takes himself in hand to carry out that plan, and who selects *such* a plan as will worthily dominate and control all the mental faculties—he it is who is most entitled to be called a true Soul, or Mind. A *planless* mental life is scarcely worthy to be called a genuine *mental* life.



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